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USSR	Monthly	Review	
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**April 1982** 

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**April 1982** 

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# Defense and the Soviet Economy

Perspective: 1	Defense and	the Economy	_
Coping With	Less		

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The conflict between the requirements of defense and the needs of the economy is posing an ever sharpening dilemma for Soviet leaders. They find themselves confronted by a more hostile international environment at a time when steadily worsening economic conditions both at home and in Eastern Europe are aggravating the burden of their defense effort. Economic choices are becoming increasingly difficult, particularly in the context of an impending succession struggle that will politicize these choices and work against changes in basic priorities in the near term. If the current leaders continue to resist making significant changes in their economic and military policies, however, they will leave their successors with a legacy of problems carrying high political, social, and economic risks.

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The articles in this issue describe the rising pressure on the Soviet economy created by an expanding defense effort and—in the Viewpoint section—the difficulties associated with any assessment of the defense burden.

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The economic problem is inadequate growth. Although the economy is still expanding, its rate of growth is falling sharply, and we expect this slowdown to continue through the 1980s. This predicament has resulted from rising resource costs, falling increments to labor and capital, shortfalls in agriculture and industry, a sharp erosion in hard currency liquidity, and planning mistakes that have led to bottlenecks in raw materials supply and distribution. Defense production exacerbates these problems because it competes directly with civilian production that will be critically needed by the economy. For example, as one article in this theme package demonstrates, armored vehicle production programs have cut deeply into the civilian base for transportation equipment. Such trade-offs will become increasingly burdensome during the 1980s.

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Secret SOV UR 82-004 April 1982 These conditions are occurring at a time when Soviet leaders see a more aggressive US challenge to their interests globally during the 1980s, supported by what they view as a US defense strategy to achieve military superiority and "increase the acceptability of nuclear war." This perception of the threat argues for more military spending, while deteriorating economic growth demands more resources for investment. The problem is that current trends in economic growth will no longer permit the Soviets to have it both ways.

How will they cope? In the near term, the Soviets seem determined to maintain the current priority accorded defense in spite of mounting economic problems:

- On the basis of observed military activity (that is, the number of weapon systems in production, weapon development programs, and trends in capital expansion in the defense industries) we expect that Soviet defense spending will continue to grow at about its historical rate of 4 percent a year through at least 1985.
- Evidence surrounding the preparation of the 11th Five-Year Plan (1981-85) suggested last-minute adjustments to permit increases in defense activities in response to an invigorated US defense effort. There are also indications that resources may have been shifted from civilian investment to the military.
- In terms of specific changes in weapons programs in response to any US buildup, however, the USSR will probably seek to avoid making any hard choices until the Congressional debate over this year's defense budget has been resolved and the shape of the US defense program becomes clearer.
- Moscow will continue to view arms control as an instrument to limit deployment of new US weapon systems requiring costly new programs to counter. This does not imply, however, a readiness to make major concessions at the negotiating table, although the Soviets will appear to be more conciliatory.
- To husband resources and limit assistance provided through subsidized export prices, the Soviets are already selectively cutting back support to Eastern Europe. Other Soviet clients may also feel the pinch.

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Sustaining these policies over the long term, however, could ultimately entail unacceptable political and economic costs—costs that will be increasingly apparent to a post-Brezhnev leadership as it struggles to prepare its 12th Five-Year Plan (1986-90). By that time, it may be evident that continued priority for defense spending at the expense of civilian investment would weaken the ability of the economy to sustain higher defense spending in the next decade and would increase Soviet dependence on Western technology and equipment for the most advanced industrial processes. Moreover, as the first article notes, if average annual growth in military outlays continues at 4 percent or higher, per capita consumption by mid-decade could well decline. Finally, any additional setbacks to East European economies because of reduced Soviet support could lead to increased political problems for Moscow as well as heightened East European resistance to accelerated military force modernization.	25 <b>X</b> 1
Faced with these conditions, a new leadership will feel greater pressure to reduce the growth in military spending in order to free up the labor and capital resources urgently needed in key civilian sectors. In this connection, the cost avoidance benefits of arms control agreements could assume greater importance in Soviet policy. The critical variables are likely to be Moscow's perception of the severity and duration of the economic slowdown and its assessment of the cost and risk of selective alterations in the military effort.	25X1
Whatever choices the new leaders make, Soviet power will continue to grow. No leader likely to succeed Brezhnev will have the power initially to push through a comprehensive package of domestic and foreign policy programs. In the past, it usually has taken a new General Secretary about five years to consolidate his power. Therefore, a policy shift that reduced the military's priority claim on resources would occur slowly and probably would not emerge before the mid-to-late 1980s. Moreover, Soviet military investment is so large that even with reduced growth the quality and military capability of the armed forces would continue to improve through this decade and into the next.	25 <b>X</b> 1
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# Guns and/or Butter in the 1980s

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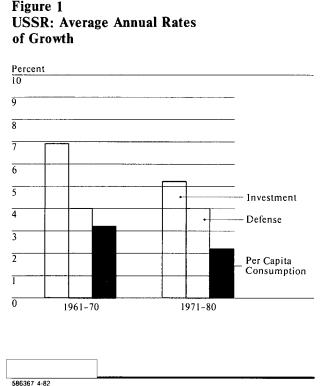
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Since the early 1960s, the Soviets have not had to choose between more guns or more butter. The rapidly expanding economy, fueled by large annual increases in labor, capital, and industrial raw materials, ensured enough resources for both (see figure 1). Although the economy has expanded more and more slowly over the last two decades, its growth has permitted Moscow to (1) amass an ever increasing arsenal of new weaponry, (2) provide the population with steady increases in living standards, and (3) stoke the economic furnace with rapidly growing quantities of investment goods.

This is no longer the case. Soviet economic growth has fallen from nearly 4 percent per year during most of the 1970s to about 1 to 2 percent per year since 1978. Stagnation in the production of key industrial materials has crippled growth in machinery output—the source of military hardware, investment goods, and consumer durables. Oil production is virtually flat and  $\overline{0}$ the output of coal and steel is falling. Soft world oil prices and no growing demand for Soviet arms are limiting Moscow's hard currency earnings. Three consecutive poor grain harvests have disrupted the USSR's livestock program and worsened its hard currency payments position. And persistent food shortages and increased prices for luxury goods have left many Soviet consumers with less on their tables and less in their pockets.

### The Economy in the 1980s

More important, we expect this trend to continue through much of the 1980s as the costs and difficulties of obtaining industrial raw materials and fuels rise and the increments to labor and capital fall. First of all, whether or not oil production falls, energy output is clearly going to increase more slowly and become more expensive. The entire increment in energy production must come from Siberia, where costs are high and infrastructure minimal. Thus, large new investment must be made in roads, rail lines, and pipelines—items with heavy up-front costs and long leadtimes. Shifting the fuel balance toward natural



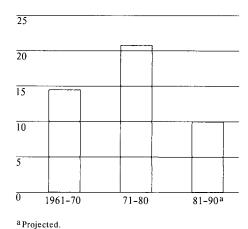
gas will require a large buildup of distribution and storage facilities (that is, more investment). Because only small annual increments in total investment are planned for 1981-85, energy exploitation and associated infrastructure will absorb an increasing share of investment resources.

On top of the investment crunch, increments to the labor force—declining since 1977—will continue to decline until 1986 and will not regain present levels until after 1990. With growth in labor productivity nearly at a standstill, demand for labor—especially skilled workers—is likely to increase (figure 2). But most of the new entrants into the labor force will be from the Muslim areas of the USSR, where labor is

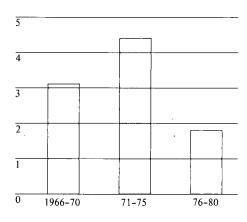
Figure 2

USSR: Growth in Labor Force and **Industrial Labor Productivity** 

Growth in Labor Force Million Persons



Growth in Industrial Labor Productivity Average Annual Percent



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generally less skilled and less mobile. Thus, we expect percent of GNP by the end of the decade. More industry will do well to achieve an average annual growth of about 2 to 3 percent. The outlook for agriculture is no better. A marked—but temporary improvement in output is likely over the next year or two if the USSR gets a break in the weather. But we see no reason to believe that sustained increases in crop yields or livestock production will be forthcoming. On balance, we expect economic growth to be only 1 to 2 percent per year by the mid-1980s and to hover near the 1-percent level through the 12th FYP (1986-90).

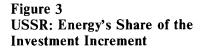
### The Defense Bite in the 1980s

Under these conditions the competition for resources will be fierce—especially if defense spending is to continue increasing at its historic rate of about 4 percent per year. We estimate that defense will continue to grow at this rate through 1985 and that the defense share of GNP will be at least 15 percent by mid-decade. If these trends are not changed in the 12th FYP, the defense burden might approach 20

important, the defense share of the annual increment to GNP could increase from the current level of onefifth to as much as three-fourths by 1990. This would drastically reduce the ability of the Soviet leadership to allocate additional resources to investment and consumption, further eroding the annual growth dividend that is so important in balancing the competition for resources and stimulating productivity.

Even though the Soviet leadership has acknowledged that defense impinges on the economy, programs now in train as well as investment in defense facilities through the late 1970s suggest that the Soviet Union had planned to at least maintain the historical 4percent annual growth rate of defense spending. It is equally evident, however, that the USSR's 1981-85 plan fails to account properly for the economic difficulties the Soviets are facing and for the declining ability of the economy to offset slow labor growth

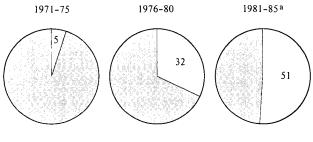
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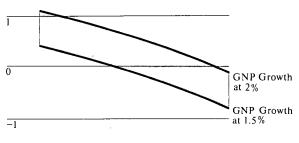


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Figure 4
USSR: Defense-Consumption
Growth Trade-Offs
(Average Annual Growth Rate 1981-1990)

Per Capita Consumption Growth (%)





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Defense Growth (%)

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with more capital investment. The opportunities for growth from substituting capital for labor will be limited by the continuing decline in capital productivity as well as by the need to sink most of the investment increment into capital-intensive projects (for example, energy and associated infrastructure) whose return is long deferred (see figure 3). All of this suggests that by mid-decade the Soviets will face a larger defense burden than they currently anticipate.

Figure 4 illustrates the trade-off between these two economic variables assuming that the economic trends described above result in an average GNP growth of 1.5 to 2 percent per year for the decade (with growth in the first half of the 1980s higher than in the last half). Under these conditions, continued growth in defense spending at its historic rate could well lead to declines in living standards. Per capita consumption probably would continue to grow marginally for the next few years, but by mid-decade would almost certainly be in decline.

Dynamic Defense Burden

The share of GNP devoted to defense spending in a given year can be called the *static burden* of defense as it represents a snapshot picture of the burden. In addition, defense spending also influences economic performance over time through its cumulative effect on economic variables. This cumulative effect is called the *dynamic burden* of defense spending. The most revealing measure of this burden for a country's population is the change in the average annual growth rate of per capita consumption associated with a change in the growth rate of defense spending.

Even at the high end of the GNP range (2 percent per year) the trade-off between per capita consumption and defense spending would not present a comforting picture to a leadership bent on maintaining the steady increases in defense that over the past two decades have moved the USSR into a position of strategic

<sup>1</sup> This judgment is reinforced by the possibility (discussed in the annex to this article) that the projections of GNP rest on productivity assumptions that may be too high in light of recent experience.

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parity with the United States. Growth in per capita consumption would average less than 1 percent annually—an imperceptible gain to the man in the street. In any case, the proclivity of the present set of Soviet leaders to continue the historic pace of defense spending may leave the new leadership, soon to arrive, with a legacy of problems carrying high political, social, and economic risks.

### **Implications**

The combination of current economic difficulties, the cumulative effect of defense spending on economic performance, and the desire to shift from an extensive to an intensive growth mode will increase the pressure for change in Soviet resource allocation decisions by mid-decade. A decision to slow the growth of defense in the 12th FYP (1986-90)—while risky politically for a new leadership, especially if international tensions are high—may be given greater currency in Moscow's deliberations, the more so if Soviet leaders perceive that a slowdown in defense spending would have little impact on the USSR's total military power

Because military programs require long leadtimes, many running 12 years or longer, a reduction in the rate of growth of defense spending is likely to have little impact on Soviet military capabilities during this decade. Soviet weapons that will be in the field through the 1980s will consist primarily of systems already in the forces as well as those now entering production and in the late stages of development. Decisions to scale back defense procurement—that is. to reduce the acquisition of military systems at the margin—are unlikely to have a major impact on the overall character of deployed forces until the 1990s. Finally, although a reduction in the rate of growth of defense spending in the mid-to-late 1980s could delay force improvements in some areas and pose difficult choices for Soviet defense planners, moderating the growth of spending for selected weapon systems could facilitate the allocation of additional resources to critical bottlenecks in the civilian economy.

### Annex: Estimating the Dynamic Burden of Defense

To estimate the dynamic burden of defense, an econometric-optimal control model of the Soviet economy called SOVCON has been developed. This annex sets forth some of the broad considerations behind its specification.

## Gross Output-Final Demand Linkage

Conventional macromodels of the Soviet economy frequently incorporate only a general consistency between production of goods and their final uses—consumption, investment, and defense. SOVCON emphasizes this linkage by incorporating the following input-output sectors:

- Energy
- Industrial Materials and Infrastructure
- Civilian Machinery
- Weapons Production and Repair
- Construction
- Consumer Goods and Services and Other.

These six sectors support the production of consumer goods, producer durables, and defense hardware and permit the model to account for generalized bottlenecks that may occur in the economy (for example, shortages of raw materials). The model also assumes that existing capital cannot be transferred between any of these sectors in the short run (that is, within one year). This assumption is particularly relevant to the civilian machinery and weapons production sectors because it is normally assumed in econometric models of the Soviet economy that capital is transferable from defense to civilian machinery production on demand.

### Allocation of Labor and Investment

Most macromodels assume that labor and investment are allocated to sectors of the economy based on historical trends or Soviet plan data. When a change in the end-use composition of GNP is specified, say between consumption and defense, the composition of the supporting gross outputs—energy, industrial materials, and so forth—and the allocation of labor and investment to the sectors will vary. However, to allocate labor and investment to the various sectors of the economy, some criterion is needed. SOVCON

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assumes that the objective of the planners is to	
increase consumption as much as possible given a	
specific rate of defense growth between 1980 and	
1990 and a specified average annual growth rate for	0574
GNP.	25X1
Soviet Production Relationships	
The production functions in the model summarize the	
relationship between the growth of output and the	
growth of resource inputs in each sector. The results	
for 2-percent growth shown in figure 4 were based on	
a Cobb-Douglas production function that assumes	
that the growth of output per worker bears a fixed	
relation to the growth of capital per worker. This	
fixed proportion is a measure of the responsiveness of output with respect to capital.	25X1
output with respect to capital.	25/1
In the Soviet Union the responsiveness of output to	
infusions of new capital has been declining rapidly—a	
fact that complicates the estimation of Soviet produc-	
tion relationships and markedly biases the trade-off	
relationship obtained using Cobb-Douglas production	
functions.	25X1
There also are production functions in which the	
capital-responsiveness of output is not a constant. For	
example, a nonlinear relationship between the growth	
of output per worker and the growth of capital per	
worker, called the Variable Elasticity of Substitution	
(VES) production function, "explains" the historical	
data since 1960 more satisfactorily than the Cobb-	
Douglas function. The resulting trade-off curve gives	
much more pessimistic results for per capita consump-	
tion than the Cobb-Douglas function. However, the	
use of the VES production function may fail to	
sufficiently credit the Soviets with an ability to arrest the decline in capital responsiveness in the late 1980s	
and may therefore result in a somewhat pessimistic	
forecast. Nonetheless, the limited availability of re-	
sources through the mid-1980s, together with the	
declining trend in capital and labor productivity,	
suggests that the outlook for per capita consumption	
may be somewhat worse than depicted in figure 4.	25X
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Moscow's Perception of	
US Defense Policy	

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The USSR's leaders have become increasingly pessimistic in assessing the prospects for Soviet-American relations and the meaning of the newly assertive US foreign and security policies. While some of the leadership, most notably Defense Minister Dmitriy Ustinov and Chief of Staff Nikolay Ogarkov, argued throughout most of 1981 for a "worst case" assessment of American intentions, other people with access to policy circles were maintaining that US policies might prove to be more "pragmatic" and accommodating than the tough "rhetoric" in Washington implied. But these relatively "optimistic" views have not reappeared since the imposition of sanctions following the declaration of martial law in Poland, and a broader consensus appears to have emerged within Moscow about the Reagan administration's intentions.

The essential elements of this consensus have now been blended into a sophisticated public campaign emphasizing that the United States:

- Has decided to adopt policies that seek out opportunities to challenge Soviet interests abroad and to exploit Soviet weaknesses at home.
- Is determined to achieve military superiority to support this more aggressive policy.
- Is seeking to "increase the acceptability of nuclear war" and to develop forces that will permit a "first-strike" strategy.

One purpose of this campaign is to blame Soviet economic problems on US and NATO policies and to prepare the Soviet people for additional sacrifices. President Brezhnev, in his speech to the Trade Union Congress on 16 March, underlined this theme when he charged that the "militarist line and aggressive policy" of the United States had forced the USSR to divert "considerable resources, to the detriment of our plans for peaceful construction." It is not certain what the Kremlin thinks will be the outcome of administration efforts to improve the US defense posture, but it is clearly worried about some features of American programs.

The planned US military buildup comes at a time of increasing economic and political vulnerability in the Soviet Union. Moreover, the leaders are facing these challenges in the context of a succession process that, in many respects, is already under way. Under these circumstances, it will not be surprising if the Soviets have serious difficulty in proceeding from the general consensus described above to a set of specific decisions about how to adjust their own military programs.

Evidence of Soviet Apprehension

There is substantial evidence that Moscow is aware of the threat to its economy posed by the US defense buildup. Two members of Central Committee departments have made statements to East European audiences that suggest the leadership is deeply worried about the prospect of increasing allocations to defense and the difficulties that this would impose on economic relationships among the Warsaw Pact allies. One stressed that the arms race is a "very heavy burden for us," which impedes "implementation of many of our economic concepts."

The notion that Washington's decision to improve the US military posture was designed to strain an already troubled Soviet economy was evident as early as the

late summer of 1981.

At a public lecture in Leningrad in February, a questioner asked whether the United States could "force the Soviet economy to its knees through trying to keep up with military expenditures." Such evidence of concern is not unexpected in view of the extensive and rather sophisticated public treatment of US defense spending plans over the last six months.

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Articles carrying detailed analysis of the US military budget have appeared in the central press, and the November 1981 issue of the journal of the Institute of the USA and Canada (IUSAC) carried a detailed analysis of the five-year defense budgets of the Carter and Reagan administrations.  **Doubts About US Capacity**  For some Soviets, apprehension over a major US defense buildup is moderated by their belief that the United States has neither the will nor the capacity to alter the balance significantly reported in the fall of 1981 to be arguing privately to Soviet government officials that the US economy and domestic political realities would frustrate the administration's plans for force modernization and expansion	addition, Moscow has revealed many of its negotiating positions in the Geneva INF talks in the course of this campaign to influence external audiences 25X1 25X1  Some Soviets have conceded to US officials that the USSR "made mistakes" in Afghanistan and Poland and that Washington would find Moscow more accommodating if only the Reagan administration would moderate its policies. Other Soviets have argued that a "harder line" is emerging in Moscow and that the United States would do well to soften its position now, before this policy takes hold.	25X1 25X1 25X1 25X1
More recently, this theme has emerged in a published analysis by IUSAC Deputy Director Zhurkin, who argued that the Reagan administration's projections for allocating 7 percent of GNP to defense "probably cannot be sustained."	Prospect of Increasing Soviet Defense Spending Despite public expressions of doubt that US plans could be realized, during early 1981 the Soviets apparently did make some adjustments to the draft 1981-85 Five-Year Plan that suggested preparations for increasing defense expenditures.  Soviets were making eleventh-hour changes to their draft 1981-85 economic plan to incorporate large	25X1 25X1 25X1 25X1 25X1
The Public Campaign In order to influence opinion in the West, the Soviets have orchestrated an unusual public campaign to counter US assessments of Soviet military power. In response to the US Defense Department's Soviet Military Power, they have published three substantial booklets. Although these do not present independent Soviet data, they are an unprecedented public presentation of Soviet views on theater and global military balances.  Several Soviets have commented privately that the	increases in defense activities. In September a mid- level official stated that 2.4 billion rubles had been cut from the budget of the Ministry of Nonferrous Metal- lurgy—about 15 to 20 percent of its planned capital investment in the 11th FYP. The resources were to be diverted to the military.	25X1 25X1 , 25X1
Kremlin's authorization of such public discussion represents a sharp break with previous behavior. In  The publications (especially Whence the Threat to Peace, published in January) represent a sophisticated attack on US doctrine, which they describe as seeking superiority, a first-strike capability, and a reduction of the nuclear threshold in Europe.	In his speech to the Central Committee in November, Brezhnev confirmed these constraints on the economy when he announced a 30-billion-ruble reduction in planned investment. He cited shortages of construction resources as the reason for the cutback, and his	25X1

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explanation finds support in the sagging performance of the steel, construction materials, and civilian machinery sectors. Despite these difficulties, we still think the revisions made early in the year may have allocated some additional funds to defense. Since the Five-Year Plan was approved in November 1981, there has been no evidence of any further modifications to it.	25X
Moscow's Likely Course	
Given conflicting pressures within the leadership and the difficulty of reaching decisions about economic and defense priorities, the Soviets probably will avoid making significant changes in the recently approved Five-Year Plan until Washington's debate over the FY 1983 defense budget has been resolved. In the meantime, the Kremlin is likely to pursue policies to soften the impact of economic stringencies and to	
dissuade the United States from adopting the full measure of the Reagan administration's defense	
plans.	25X <sup>-</sup>
At home, the Soviet Government can be expected to seize upon the projected US defense buildup as a scapegoat for its failure to solve the country's economic problems. In their relations with the Warsaw Pact allies, the leaders may also be able to point to increasing arms competition as an excuse for not fulfilling their economic commitments in Eastern Europe and for pushing the East Europeans to proceed as planned with military modernization programs. With both Soviet and East European audiences, the Kremlin can be expected to hammer on the themes of an increased danger of war and the necessi-	
ty for belt tightening.	25 <b>X</b>
Abroad, the leadership will pursue a course of calling attention to the "aggressive" character of US foreign and military policies while stressing Moscow's willingness to engage actively in a broad variety of arms control negotiations. Brezhnev's recent Trade Union speech is only one of a series made by Politburo members in the past year along these lines. Such efforts to appeal to public audiences in both Western Europe and the United States seem certain to con-	
tinue.	25 <b>X</b>
	25X

The Defense Burden and East-West Economic Relations		25X1
Mounting economic problems in the USSR have made Western goods and technology increasingly important to Soviet defense programs. Legal and illegal acquisitions of military-related technology have saved the Soviets time and resources in designing and producing new weapons and military support systems, and Western goods have eased the burden of defense spending by improving the performance of a strained civilian economy. The rising importance of Western	<ul> <li>Comparison of preliminary Western component designs with the final designs of the components after successful testing can help their engineers avoid mistakes in developing similar components.</li> <li>Use of Western test procedures, instruments, and data improves their ability to test weapon components and systems.</li> </ul>	
goods and technology in the 1980s will give the West a limited ability to hamper Soviet military programs by restricting trade and credits.  The Soviets are relying on East-West trade and	• Introduction of Western production processes and equipment directly into their assembly lines has accelerated manufacture of key components. The Soviets have even incorporated Western components directly into weapons in order to meet urgent mis-	25 <b>X</b> 1
technology transfer to provide partial relief from the military's tightening squeeze on economic resources.	sion requirements.	25X1
By acquiring weapons-related technology, they are seeking direct relief by raising defense industry efficiency and thus moderating the growth of military spending. Through trade, a less direct approach, they are obtaining goods and technology to enhance expansion of civilian economic output and thus give the economy more breathing room.	Evidence has been accumulating on specific military gains from legally and illegally acquired Western equipment and technology. For example, the Soviets have enhanced their ASW capabilities through illegal acquisition of antisubmarine warfare technology and a wide variety of COCOM-controlled minicomputers. They also are applying Western designs and industrial technology to the IL-76 aircraft for their airborne	25X1
Acquisition of Military Technology: The Direct Approach Moscow has given top priority to its program to acquire and exploit Western military technologies. By using Western know-how and hardware, the Soviets	warning and control aircraft program. Numerically controlled Western machine tools are being used to produce the SU-25 ground support fighter, and Western wide-body aircraft technology has been incorporated into a new transport/cruise missile carrier, the	·
have reduced engineering risks, cut R&D and production costs, and incorporated countermeasures against	AN-400.	25 <b>X</b> 1
Western weapons early in their own weapon development process.	Military Requirements for the 1980s  The increased need for qualitative improvement in military equipment will heighten Soviet interest in	25X1
The Soviets have several means of exploiting Western technology and hardware:	obtaining Western technology. Advances in micro- electronics and materials probably will pace the devel- opment of new weapon systems in both the East and	
<ul> <li>Western materials research, manufacturing processes, and specifications help them develop improved materials for military applications.</li> </ul>	the West. Accordingly, the Soviets and their Warsaw Pact allies will probably view many new Western component and subsystem technologies as important to their military programs. For example, advanced	

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<sup>1</sup> COCOM members are the NATO nations—except Iceland—and Japan.

Table 1
Soviet Hard Currency Trade

	Exports, f.o.b.						Imports, f.o.b.					
	1970		1975		1980	1970	1975		1980			
	Million US \$	Percent of Total		Percent of Total		Percent of Total	Million US \$	Percent of Total		Percent of Total	-	Percent of Total
Total	2,201	100	7,835	100	23,498	100	2,708	100	14,257	100	26,017	100
Of which:												
Fuels	493	22	3,887	50	15,095	64	8	NEGL	497	3	700 a	3
Crude oil and petroleum products	387	18	3,276	42	12,028	51	8	NEGL	497	3	700 a	. 3
Natural gas	13	1	220	3	2,706	12	0	0	0	0	0	0
Coal and coke	93	4	391	5	362	2	0	0	0	0	0	0
Machinery and equipment	140	6	560	7	1,388	6	927	34	4,593	32	6,039	23
Ferrous metals	129	6	167	2	246	1	279	10	2,567	18	3,469	13
Chemicals	67	3	256	3	765	3	208	8	742	5	1,565	6
Wood and wood products	365	17	712	9	1,476	6	84	3	214	2	203	1
Agricultural products	205	9	572	7	478	2	615	23	3,856	27	8,800	34
Grain	22	1	3	NEGL	0	0	101	4	2,323	16	4,400	17
Other	183	8	569	7	478	2	514	19	1,533	11	4,400	17
Consumer goods	76	3	215	3	152	1	260	10	436	3	745	3

a Estimated.

microelectronics is necessary for the production of guidance components for missiles and precision-guided munitions, signal-processing devices for ASW and airborne radar, and minicomputers for electronic warfare systems and other battlefield electronics. Advances in producing powdered-metallurgical materials are prerequisites to the manufacture of advanced airframes, aircraft engines, and penetrators for kinetic energy munitions.

# East-West Trade: The Indirect Approach

Trade plays an indirect role in cushioning the defense burden insofar as Moscow is relying on East-West trade to enhance civilian economic productivity and sustain growth and living standards during this period of deteriorating economic conditions. In particular, the Soviets are counting on Western goods and technology to help raise the technological level of its plant and equipment, relieve industrial supply bottlenecks, and maintain living standards. Imports of machinery, ferrous metal products, and foodstuffs have dominated Soviet hard currency purchases from the West, which rose from 23 percent of total Soviet imports in 1970 to 38 percent in 1980 (tables 1 and 2).

Agricultural Products. Grain imports—and more recently, meat, sugar, vegetable oil, and soybean imports—have been vital to maintaining Soviet living standards. Net annual grain purchases (which averaged 11 million tons during 1971-78) have tripled (to an average of 33 million tons during 1979-81) because of the three poor harvests. The Soviets will have to import roughly 30 million tons of grain annually—even if their own grain output returns to trend levels—in order to regain momentum in their effort to expand meat supplies.

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Table 2 Percent

# **Share of Hard Currency Trade** in Total Soviet Trade

	Soviet	Expor	ts	Soviet Imports			
	1970	1975	1980	1970	1975	1980	
Total	17	23	31	23	38	38	
Fuels	25	37	42	4	34	NA.	
Crude oil and petroleum products	26	40	43	10	72	NA	
Natural gas	2	34	48	0	0	NA	
Machinery and equipment	5	9	3	22	37	26	
Ferrous metals	10	6	7	47	77	75	
Chemicals	18	25	36	34	42	42	
Wood and wood products	44	37	48	34	27	15	
Agricultural products	14	24	25	27	42	66	
Grain	6	1	0	73	87	90	
Consumer goods	23	26	13	12	9	9	

Oil and Gas Equipment. Western equipment was important in increasing the Soviets' energy production in the 1970s and will be essential to the oil and gas industries in the 1980s. The Soviets particularly need Western equipment for exploration, drilling, oil production, offshore operations, and gas pipeline construction. Without those imports, the oil and gas production lost could amount to some 2 million barrels per day (calculating gas in oil-equivalent terms) in the middle and late 1980s, roughly 10 percent of the combined oil and gas output that we expect by then.

Chemical Equipment. Western equipment and technology are contributing substantially to growth in the chemical industry. Such imports in the 1970s enabled the USSR to double production of nitrogen fertilizer and plastics, triple synthetic fiber output, and become the world's leading ammonia exporter. Without a continued flow of Western equipment, the Soviets will have to import many more chemicals than they currently do—or cope with more serious shortages than they already have.

Vehicles and Machinery. Imported equipment and technology can aid machine-building sectors considerably. With Western help the Soviets have modernized and expanded their truck industry, which produces military as well as civilian vehicles. During the first half of the decade, Moscow plans to buy Western plants and know-how for producing construction vehicles, including earthmovers and tractors, and will probably continue to import high-capacity mining equipment.

Machine Tools and Robots. The USSR is turning to the West for the advanced machine tools and industrial robots increasingly needed to improve both military and nonmilitary industrial productivity. After importing tools worth more than \$4 billion in the 1970s, the Soviets will almost certainly focus on purchasing advanced numerically controlled tools and machining centers. They have bought robots from Japan, France, and Italy—as well as Hungary—and have acquired foreign designs and manufacturing technology to produce better robots domestically

Computers and Microelectronics. Weaknesses in computer production and microelectronics technology have induced the Soviets to buy Western equipment. Since 1972, Moscow has imported more than 1,300 computer systems—94 percent of them minicomputers, generally for R&D—valued at \$400 million. The Soviets have also illegally acquired computers embargoed by COCOM. They have obtained—legally and illegally—a full range of microelectronics-related technology, materials, and equipment, altogether worth several hundred million dollars. Continued commercial and clandestine access to Western computers and microelectronics will be important to many sectors of the Soviet economy.

The Role of Western Credits. The availability of Western credits and Soviet willingness to accept an increasing debt burden will heavily influence the scale and timing of Soviet hard currency imports in the 1980s. Because Soviet hard currency earnings are likely to decline in the next few years, the share of hard currency imports that must be covered by credits will probably rise from the 1981 level of roughly 18 percent.

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Table 3

Potential Impact of Western Trade Restrictions on Selected Soviet Economic Sectors

Product or Technology	Impact of an Em	bargo	Remarks			
	By US Alone	By US and Allies				
Grain	Small	Substantial	Allied action, including Australia, could reduce Sovi imports by 70 percent; Soviets can import grain from non-US suppliers to fulfill needs.			
Other agricultural products	Small	Moderate	Allied embargo would aggravate already serious food shortages; US is not a major supplier.			
Oil and gas equipment	Small	Substantial	Allied denial would reduce expected Soviet oil and gas output by 2-3 million barrels/day by late 1980s. Allied countries within roughly two years could overcome US monopoly in high-capacity oil pumps.			
Industrial materials						
Large-diameter pipe and rolled steel	Small	Substantial	Western Europe and Japan supply all of the pipe critical to growth in gas production and most of the rolled steel imports for machine building and metalworking.			
Chemical products	Moderate	Moderate	Allied embargo would be felt throughout economy; US denial of superphosphoric acid would hurt Soviet fertilizer production. Pesticides are needed to boost crop yields.			
Chemical equipment	Small	Moderate	Western denial would affect all economic sectors; US provides only a small share of equipment imports.			
Machinery						
Machine tools and robots	Small	Substantial	COCOM countries provide most of Soviet needs; non- US suppliers are numerous.			
Construction and mining	Small	Moderate	Western denial of production technology for construc- tion equipment would disrupt Soviet plans to increase domestic equipment manufacture; denial of mining equipment would create only short-run difficulties; non-US equipment is widely available.			
Automotive	Small	Small	Soviet are unlikely to need substantial imports of Western equipment and technology in next few years.			
Computers	Moderate	Moderate	Allied restrictions would have considerable impact on large computers but not on minicomputers, which are available from non-COCOM members; Soviets perfer US products and services, although non-US firms could almost duplicate some US offerings.			
Microelectronics	Small	Substantial	Soviets will need substantial acquisition of Western equipment and technology—by legal and illegal means; US retains leading edge, but Japan and Western Europe can supply most Soviet needs.			
Telecommunications	Small	Small	Soviets can cover most needs from Eastern Europe and non-COCOM Western countries.			

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Neither Soviet planners nor Western bankers will permit a massive financial burden to develop, however. Given the current credit picture, Moscow will probably have to settle for little or no growth in imports over the next few years. If the West were to sharply reduce the availability of credit, Moscow would have to cut imports substantially.

Impact of Trade Restrictions

Western restrictions on trade and technology transfer, by increasing the strain on the Soviet economy, would almost certainly hinder Moscow's defense effort.<sup>2</sup> Any reduction of trade in civilian goods and technology would increase the pressure on military programs because most Soviet defense industries also produce for the civilian sector and would probably have to fill part of the gap. For example, an embargo on largediameter gas pipe and other high-quality steel products could cut into Soviet production of such defense items as submarine hulls. An embargo on equipment for plants that manufacture construction and mining vehicles (as well as an embargo on such vehicles themselves) would increase the pressure on Moscow to shift some of the floorspace in military plants to producing vehicles for the civilian economy.

A Western embargo of industrial plant and equipment would also hurt military programs directly. For example, denial of microelectronics components and production technology would hinder the development of weapon guidance systems and of precision machine tools for specialized defense production. Denial of numerically controlled machine tools would hamper such defense-related production as the manufacture of gears and disks for high-performance turbojet engines. Tighter restrictions on technology transfer would also slow the qualitative improvements in Soviet weapon systems needed to keep pace with Western military capabilities.

<sup>2</sup> This discussion assumes effective and sustained cooperation by all COCOM countries and ignores the economic and political difficulties inherent in achieving that cooperation.

Limits of Restrictions. Western restrictions on trade and technology transfer would affect Soviet defense programs, but the impact would be limited. In most cases, a unilateral US embargo would be ineffective, because other COCOM countries could take up the slack (see table 3). In some cases, important goods are available from non-COCOM countries.

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If the Soviets were to alter some of their defense programs in response to Western restrictions, they probably would not significantly redirect their efforts in strategic nuclear forces. They value greatly the political as well as the military usefulness of these forces and perceive a continuing need to modernize them—partly as a result of potential US advances. Moreover, most of the industrial resources devoted to strategic forces—such as highly advanced materials, microelectronics, and propulsion technologies for missiles and aircraft—are too specialized to be readily useful in the civilian industry. A reduction in size and quality of general purpose forces, on the other hand, would free up larger amounts of labor and material resources, and these would be more readily transferable to important civilian needs, such as energy, agriculture, and transportation—as suggested in the following article.

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Armored Vehicles Versus Transportation Equipment: A Case Study in Resource Competition

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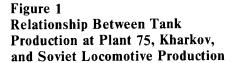
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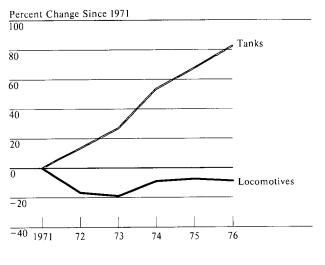
In the USSR, most of the plants, manufacturing technologies, and skilled workers used to produce armored vehicles are equally suitable for production of transportation equipment critical to the civilian economy. Over the past decade, increases in tank production have coincided with declines in the output of railcars and locomotives, and production of wheeled armored vehicles has apparently limited growth in the output of general purpose trucks. Cuts in armored vehicle production, or even a reduction in growth, could release material and skilled manpower resources to increase production of transportation equipment and thereby benefit a faltering Soviet economy.

# Inroads Into the Industrial Base

Armored vehicle production programs have cut deeply into the civilian industrial base for transportation equipment. They require relatively few advanced or highly specialized manufacturing technologies and often use facilities that also produce transportation equipment. During the past decade, increases in armored vehicle production have diverted critical foundry capacity, skilled fabrication labor, and machining capabilities from civilian production programs. Moreover, a substantial amount of new plant space at these dual-use facilities has gone to military production.

Tank production consumed a growing share of production resources at Plant 75 in Kharkov during the early 1970s, and this resource drain apparently restricted production of engines and components for diesel-electric locomotives. The T-64 program entailed production of opposed-piston tank engines at Plant 75, which made heavy demands on the plant's foundry capacity, the primary limiting factor in engine production at the plant. Prior to the start of the T-64 program, Plant 75 had been a major supplier of opposed-piston locomotive engines and components. Throughout the 1960s, it had also been a major final assembler of the T-55 tank, with engines supplied by another plant. Figure 1 shows the apparent effect the





loss of locomotive production at Plant 75 had on 25X1

diesel-electric locomotive production during the Ninth Five-Year Plan (1971-75).

An even larger share of Plant 75's resources will go for tank production during the 1980s. Preparations for still another new tank production program began in the early 1970s and are now probably complete. This work entailed construction of nearly 80,000 square meters of new fabrication, assembly, and manufacturing floorspace. These new facilities will make even greater demands on Plant 75's foundry capacity and skilled manpower.

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Figure 2
Relationship Between Tank
Production at Plant 183, Nizhniy
Tagil, and Soviet Railcar
Production

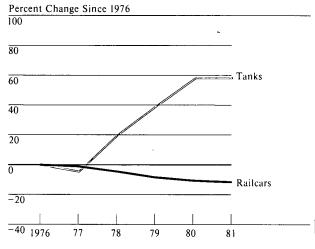
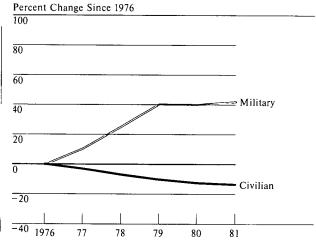


Figure 3
Relationship Between Civilian and
Military Production at Gor'kiy
Automobile Plant



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During the late 1970s, production of the T-72 tank consumed a growing share of production resources at Nizhniy Tagil Railcar Plant 183 and apparently hampered extensive efforts to increase railcar production. Although Plant 183 was already the largest railcar plant in the USSR, during the 1970s an expansion of some 90,000 square meters of new plant space was configured primarily for railcar production. The start of full series production of the T-72 tank at the plant in the middle 1970s, however, drew heavily on foundry capacity and skilled fabrication manpower that could otherwise have been used for railcar production. As a result, T-72 tank production increased and Soviet railcar production continued to fall (see figure 2).

During the late 1970s, armored vehicle production at Gor'kiy Automobile Plant (GAZ), a major producer of trucks for the civilian economy, apparently preempted substantial new capacity built between 1970 and 1980. More than 300,000 square meters of floorspace were added, increasing foundry, final assembly, and

quality-control resources. Apparently, most of these new facilities were used to increase production of the BRDM-2-series wheeled armored vehicles and the BTR-60-series armored personnel carrier (APC), and to start the BTR-70 APC production program. As a result, during 1976-80 military vehicle production at GAZ increased, while the output of civilian trucks declined (see figure 3).

Impact on Availability of Automotive Components

Armored vehicle production programs use a large share of the Soviet output of high-quality automotive components that otherwise would go for production of a broad range of civilian vehicles, from tractors and medium trucks to heavy mining and construction equipment. Military vehicle programs have priority call on limited supplies of such components as electric motors, heavy shock absorbers, bearings, gears, high-performance diesel engines, and hydraulic cylinders, motors, and tubing. This diversion of high-quality

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components to armored vehicle production inhibits Soviet efforts to increase the output and improve the reliability and durability of civilian vehicles. Wheeled armored vehicles such as the BTR-60 and BRDM-2 are good examples. These vehicles are truck chassis mounting light armor bodies and use many of the same components as the GAZ-66 series trucks, which are widely used in agriculture as well as in the armed forces.

### Impact on Industrial Modernization

Armored vehicle production has also laid priority claim on new manufacturing technologies and therefore has impeded modernization of civilian production. The largest and most capable research and development organizations charged with introducing innovations in civilian product design and manufacturing are also heavily committed to armored vehicle programs. Consequently, priority efforts to improve the productivity and quality of foundry and machining processes, as well as welding and heavy fabrication techniques, have frequently focused on manufacturing methods, materials, and processes for armored vehicle production programs. These modern technologies are generally automated manufacturing processes that offer high-quality, high-volume production with less manpower and lower scrap rates. The large amounts of such tooling introduced into armored vehicle production operations, if used instead for civilian products, would have increased the output and quality—and lowered the cost—of transportation equipment in the USSR. (See table for examples.)

# **Advanced Manufacturing Technologies Used** in Soviet Armored Vehicle Production

Current Military Use	Potential Civilian Use
Gun tubes, armor	Railcar wheel pairs, crankshafts
Armor fabrica- tion	Heavy-duty welding
Armor fabrica- tion	Main frame fabrication
Gun tubes, axles	Railcar and truck axles, crankshafts, hydraulic cylinders and tubing
Engine blocks, brake drums, hy- draulic compo- nents	Engine blocks, brake drums, hydraulic components
	Military Use Gun tubes, armor  Armor fabrication Armor fabrication Gun tubes, axles  Engine blocks, brake drums, hydraulic compo-

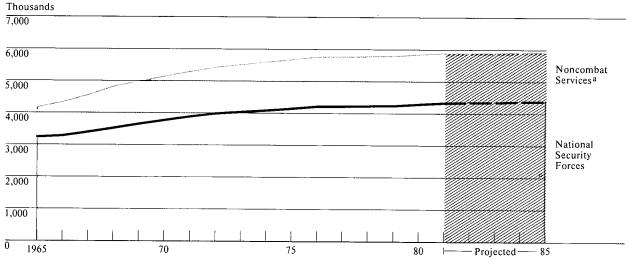
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Outlook for Soviet Military Manpower in a Decade of Shortage		25X1
Until recently, both the economy and the military benefited from an expanding Soviet manpower supply. The 1980s, however, pose a demographic dilemma for the military—a decline in the number of young men available for either service as conscripts or training to become officers. This dilemma is further complicated by a rising proportion of ethnic minorities among these young men. To gain the flexibility necessary to	Life as a conscript is notoriously harsh, and few reenlist. The limited time available for training conscripts means that career personnel do all the jobs that require special skills. The usual conscript jobs are extremely narrow and specialized. Nearly all the career military are officers, who are educated in the Soviet Union's 135 four- and five-year military colleges. <sup>2</sup>	25 <b>X</b> 1
deal with both the shortage and the ethnic aspects, the Soviets may increase the term of service for conscripts by six months or more. Their solution for the officer corps is less clear-cut. Whatever measures are adopted, the costs to the civilian economy will be relatively	Impact of Demographic Trends on the Military Manpower Shortage. One of the demographic effects of World War II was a decline in the size of the draft- age cohort in the early 1960s. <sup>3</sup> For instance, in 1963	
Background An expanding manpower supply during the early Brezhnev years facilitated the growth of the military by 1.8 million men to its current level of 5.9 million, as shown in figure 1. Of these, 4.4 million are in the national security forces, performing tasks analogous to those of the US military, and 1.5 million are in noncombat service in the Construction, Railroad, and Internal Security Troops. The noncombat services (of	the number of males reaching draft age was only 40 percent of what it had been five years earlier. In the 1980s a second demographic effect is beginning to appear as the children of the small cohort born during the war themselves reach draft age. This dip will be shallower than that of the 1960s (the 1985 level will be 80 percent of the 1980 level), but it will mark a permanent turning point. The mid-1960s saw a quick return to manpower abundance, but the 1980s will not. Thus, even though the impending shortage will be less severe in the short run, its long-run effects will be	25X1
which the United States has no counterpart) carry out	more serious.	25X1
tasks that are critical in the Soviet Union: maintaining internal order and assisting the chronically backlogged construction sector.\(^1\)  Only 30 percent of the military are career personnel; the rest are conscripts serving a two-year term (three years in seagoing units). Conscripts have no choice in their service assignment. The Strategic Rocket Forces and the Air Forces take the best educated, while the	In the past the Soviet military appears to have subordinated its demand for conscripts to the changing manpower supply (see figure 2). Troop reductions in the late 1950s preceded the dramatic decline in the number of available males, and the increased conscription of the late 1960s closely followed the rapid recovery in the relevant age cohort. If the Soviets make no changes in conscription policy to accommo-	25X1
noncombat services are left with the least educated,	date the flagging supply of the 1980s, by mid-decade	
the politically suspect, or the least physically fit.	military manpower will have to be cut by 1.1 million men. We do not believe Moscow will permit this to	25X1
	happen. 25X1	25 <b>X</b> 1
	<sup>2</sup> Approximately 19 percent of armed forces personnel are officers, while 7 percent are warrant officers or career NCOs. In the US military, career NCOs (E6-9) and warrant officers are 19 percent of the armed forces.	053/4
	<sup>3</sup> A cohort is the number of Soviet males who reach draft age each year. In 1968 the draft age was lowered from 19 to 18.	25X1 25X1





<sup>a</sup>The Construction, Railroad, Civil Defense, and Internal Security Troops are not considered to have national security roles.

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Evidence of an official reaction to the pending manpower shortage is beginning to appear: early in 1982 the Soviets substantially reduced the number of educational deferments at many universities and institutes. As a result, many university-bound students probably will be conscripted before they complete (or even before they start) their higher education. This action will improve the quality of conscripts only marginally and will have a number of other effects:

- It will interrupt the education and delay entry into the labor force of the civilian economy's best educated workers.
- If every conscripted college student now serves the entire two years, the civilian economy will lose an additional six months' work. In the past, those who had completed higher education later served only a short tour of duty—18 months at most.<sup>4</sup>

<sup>4</sup> However, full-time college students make up only about 10 percent of a draft cohort.

Ethnic Composition: Conscripts. Figure 3 shows the CIA estimate of the changing ethnic composition of the draft-age (18-year-old) population. Until 1970 the ethnic shares had been stable for many years, with Slavs at about three-quarters and non-Slavs at one-quarter. By 1980, however, non-Slavs had risen to one-third of the draft-age population, and for the first time Russians were no longer in the majority. By the end of this decade, nearly 40 percent of 18-year-olds will be non-Slavic; the Slavic advantage will have slipped from 2.8 to 1 to 1.6 to 1.

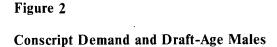
The issue of ethnic "quality" is not new to the Soviet military. The Soviets already have a mechanism for absorbing ethnic minorities. Estimates of the size and ethnic makeup of the noncombat services demonstrate that they serve the purpose of an ethnic "sponge," exposing minorities to political indoctrination and military discipline while preserving Slavic dominance of the national security forces.

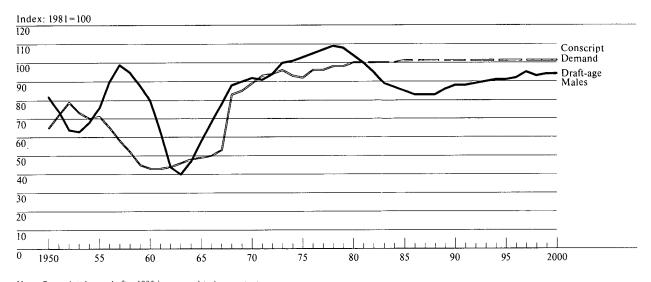
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Note: Conscript demand after 1985 is assumed to be constant.

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In 1982 the noncombatant services will absorb the majority of all non-Slavic conscripts. The share of non-Slavs in the national security forces is currently about one-seventh, even though they are one-third of the draft-age population. If the Soviets keep the proportion of non-Slavs in the noncombat services the same as it is now and if overall manning levels remain constant, the proportion of non-Slavic conscripts in the national security forces will rise from one-seventh to one-fourth. This will still be less than their percentage in the draft-age population, but it will be a significant change in the composition of the forces

Ethnic Composition: Officers. Although the ethnic makeup of conscripts has been changing, the officer corps has remained a largely Russian preserve. Probably 80 percent of officers are Russian, 5 to 10 percent are non-Slavic, and the rest are of non-Russian Slavic origin. There are no official ethnic barriers to admission to the national system of military colleges, but a candidate must pass difficult

exams, including one in Russian literature. Minorities are typically at a disadvantage. In addition, the strenuous efforts that raised the proportion of college-educated officers from 41 percent in 1973 to 68 percent in 1980 probably increased the ethnic homogeneity of the officer corps.

As the number of college entrants and the share of Russians among them decline in the 1980s, it will be difficult to maintain both the high educational standards and the ethnic exclusivity of the officer corps. We estimate that in 1960 less than one-tenth of all male Russian college graduates became active (as opposed to reserve) officers. In 1980 this was about one-fifth, and by 1990 it probably will be one-third. Competition between the military and civilian sectors for the highly educated Russians is bound to intensify.

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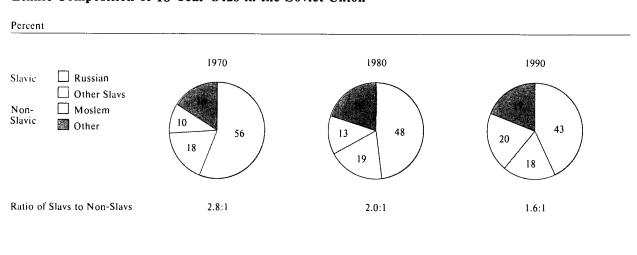
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Figure 3

Ethnic Composition of 18-Year-Olds in the Soviet Union



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### Soviet Options: Conscripts

Force Reduction. Only a permanent reduction of roughly 1 million in the size of the armed forces would be sufficient to overcome the shortage in the mid-to-late 1980s. Such a decline would have a one-time economic value, representing a 20-percent increment to the net growth of the civilian labor force expected during the decade. Of course, draft-age youths are largely unskilled and inexperienced, and their value in terms of income in civilian pursuits is relatively low. Most would make only minimum wage, recently raised to 80 rubles per month, while the average civilian wage is 170 rubles per month.

From a political and military viewpoint, the disadvantages of force reduction are enormous. It would:

- Require a dramatic shift in defense philosophy and foreign policy.
- Disrupt costly operating and procurement processes.

 Rapidly increase the proportion of minorities in the national security force, unless conscription concentrated on Russians.

We believe force reductions are not an option currently under serious consideration by Soviet leaders, even though they did adopt this solution in the late 1950s.

Limited Deferments. In a country already practicing universal conscription, there is little slack to be found in deferments, and not nearly enough to offset the manpower shortage. We estimate that under previous Soviet standards, between 10 and 15 percent of the members of a draft cohort avoided service altogether by reason of education, family hardship, or health. As noted, educational deferments have been recently tightened, and further major gains from tightening are not practical.

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Service Term Extension. We estimate that a sixmonth extension of the current two-year term of service would maintain military manpower at its present level. Conscription rates would still be near the maximum feasible, but within historical levels. A six-month extension would incur economic costs: it would delay entry into the labor force and cause all the costs of the declining 18-year-old cohorts to be borne by the civilian economy. The main advantage of an extension would be that military manpower levels would remain constant. In addition, by allowing the noncombat "sponge" to remain its present size, an extension of service time provides flexibility for dealing with ethnic shifts in the draft-age population.

### Soviet Options: Officers

Unlike conscript service, the choice of a military career is voluntary. This sharply limits the Soviet leaders' options for maintaining the ethnic and educational standards of the officer corps. The tight labor market of the 1980s will offer college graduates a wider choice among civilian occupations, and the military may be forced to accept officer candidates with less schooling.

Half measures to relieve the problem might include encouraging officers to stay on active duty longer, creating slots for more retired or reserve officers, and further encouraging military "spirit" in high school youth. These half measures are unlikely to be effective. There are, however, three longstanding policies which might be pursued more vigorously, though they also have weaknesses.

Intensified Ethnic Assimilation. The Soviets might step up their efforts to promote ethnic assimilation via Russian language instruction in school. This long-standing policy has achieved some gains, but there is widespread agreement that it has failed to erase ethnicity as a fundamental cleavage in Soviet society.

Increased Prestige. The Soviets could also continue trying to raise the prestige of a military career. As the demand for better educated officers has grown, so too have efforts to appeal to a more sophisticated youth.

Nevertheless, surveys of occupational prestige in the Soviet Union suggest that while officers enjoy considerable prestige generally, young people do not see a military career as especially attractive. Minorities are likely to be particularly resistant to increased recruitment efforts. They are reluctant to relocate from their home republics; they have been less likely to choose college majors in technical fields of interest to the military; and in many cases they are all too familiar with ethnic prejudice in the services, from the military experience of friends and relatives.

Increased Pay and Privileges. Finally, the Soviets may consider increasing officer pay or perquisites. Two factors weaken a potential monetary incentive effect, however: military pay scales are classified information and are not widely known in the Soviet Union; and in any case, consumer purchasing power already far exceeds the availability of consumer goods. More appealing to a Soviet civilian would be the perquisites, particularly the guaranteed access to scarce housing. However, such benefits are not the exclusive preserve of officers. For example, a youth wary of the hardships of military life could obtain the same benefits as a civilian party member

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<b>Expenditure In</b>	nplications	of
<b>Projected Sovie</b>	et Strategio	:
Attack Forces		

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A cost analysis of the strategic force options forecast in National Intelligence Estimate 11-3/8-81 indicates that cumulative spending for Soviet intercontinental and peripheral attack forces during the 1981-90 period may be 30 to 65 percent greater than outlays for these forces in the previous 10 years. Investment in new, more capable weapon systems is expected to be the major factor driving costs upward. However, since outlays for these forces represent only 10 to 15 percent of projected total defense expenditures, increases in spending for the strategic attack mission alone probably will not significantly affect either the growth of overall defense expenditures or the resources available to the civilian economy.

Spending Trends, 1971-80

During the period 1971-80, the Soviets allocated approximately 65 billion rubles in investment and operating costs to their strategic attack forces. About two-thirds of the cumulative expenditures for this mission went to those forces assigned targets in the continental United States and about one-third to forces whose primary targets would be along the periphery of the Soviet Union.

Investment in new weapon systems and facilities dominated Soviet spending for strategic attack forces in the seventies, accounting for about 80 percent of cumulative outlays. This intense effort bought the Soviets an intercontinental attack force at least equal to that of the United States and a more survivable peripheral attack force with better coverage of potential targets at the theater level. Spending for intercontinental attack fluctuated in response to the procurement cycles of ICBMs and SSBNs. It was highest in the mid-to-late seventies because of the procurement of the SS-17, -18, and -19 ICBMs and the D-class

'Strategic forces are defined according to the guidelines in the Defense Planning and Programming Categories (DPPC) issued by the US Department of Defense and exclude research, development, testing, and evaluation and nuclear weapons production. These cost calculations were derived using the SMART model—a computer-based methodology that permits rapid cost calculations of alternative force projections

SSBNs. Spending for peripheral attack forces rose steadily during the period. The increase was caused by production of the Backfire bomber and by costs associated with the SS-20 IRBM program.

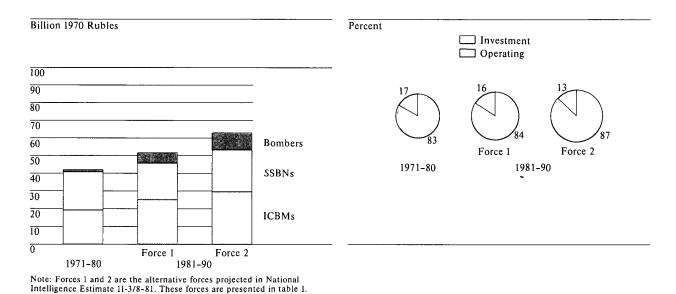
Expenditure Implications of Alternate Forces
Projections

Figures 1 and 2 show estimated cumulative outlays for intercontinental and peripheral attack for the 10year periods 1971-80 and 1981-90. The bars for 1981-90 show alternative cost estimates based on the Intelligence Community's projections of the number and characteristics of Soviet strategic attack forces. Total investment and operating costs for all combinations of projected intercontinental and peripheral attack forces are expected to increase significantly in the eighties. Under the least costly combination of force projections, we would expect the Soviets to spend approximately 85 billion rubles, about 30 percent more than they spent on this mission in the seventies. For the most costly combination of forces, Soviet spending between 1981 and 1990 would be over 105 billion rubles, about 65 percent more than spending during the previous 10 years. As was the case in the seventies, investment in new equipment and facilities will be the major factor driving spending upward.

Intercontinental Attack. We estimate that to deploy and operate the NIE's baseline intercontinental attack force (force 1 in table 1) would cost the Soviets over 50 billion rubles, about 25 percent more than cumulative spending for this mission in the seventies. The increase in spending reflects the expectation of a vigorous Soviet effort to expand and augment its intercontinental attack forces, particularly in the early eighties. This projection is consistent with current evidence on Soviet programs and recent trends in deployment rates and force composition. Investment in ICBMs and SSBNs is expected to continue to dominate spending trends for intercontinental attack.

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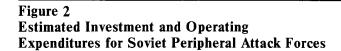
The Soviets, however, are expected to increase their emphasis on the long-neglected long-range bomber force, increasing its share of cumulative outlays from about 3 percent in the seventies to over 10 percent in the 1981-90 period. Key features of this projection include:

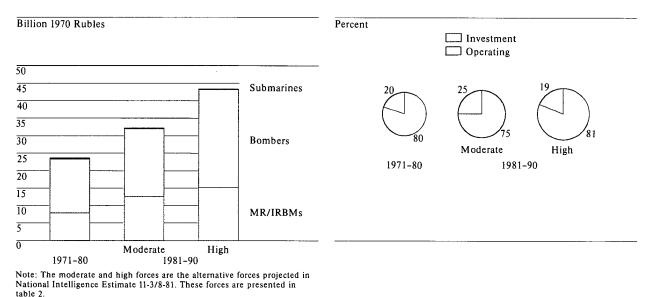
- Continued deployment of improved versions of the SS-17, -18, and -19 and the introduction of follow-on systems with greater accuracy and payload.
- Introduction of a medium-size solid-propellant ICBM as replacement for the remaining SS-11s and a small solid-propellant missile for deployment on mobile launchers.
- Deployment of an additional four D-class and 11
   Typhoon-class SSBNs along with improved versions of the SS-N-18 and SS-NX-20 SLBMs.
- Deployment of a new strategic aircraft similar to the B-1 and capable of carrying either bombs, ASMs, or cruise missiles.

To deploy and operate an augmented intercontinental attack force (force 2 in table 1) would cost the Soviets about 10 billion rubles more than estimated for force 1. Cumulative outlays for force 2 in the 1981-90 period would be about 50 percent greater than expenditures for intercontinental attack forces during the 1971-80 period. Force 2, however, represents neither a maximum Soviet effort nor an upper bound for technological potential. It is a plausible and achievable future Soviet intercontinental attack force given the uncertainties regarding improvements the Soviets might make and the potential deployment levels for new systems. The increase in outlays over force 1 reflects the added investment the Soviets would make if they chose to enhance the survivability and destructive potential of force 1 in the late eighties.

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Die 2.

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Key departures from force 1 include:

- Deployment of ICBMs having greater numbers of warheads: an SS-18-size missile with 24 warheads, an SS-19-size missile with 10 warheads, and a medium-size solid-propellant missile with 10 warheads.
- Deployment of an additional four Typhoon-class SSBNs.
- A doubling of the number of mobile ICBMs deployed, including a medium-size solid-propellant missile in a multiple-aim-point system.
- A doubling of the number of new strategic bombers deployed.

Peripheral Attack. We estimate that the cost of deploying and operating the moderate peripheral attack force would be about 30 billion rubles, about one-third more than the Soviets spent on this mission in the seventies. The increase in spending reflects a continuation of the vigorous effort to augment the survivability and destructive potential of their peripheral attack forces in the eighties. It is

consistent with current evidence on Soviet programs and recent trends in deployment rates. In part, the growth in expenditures results from an expected increase in operating costs caused by the retention of a large number of older strategic bombers in the force through 1990. As in the past, however, investment will be the major factor driving expenditures upward. Costs associated with the Backfire bomber and SS-20 missile programs will continue to dominate spending trends. Major features of this projection include:

- A peak deployment of 450 SS-20 launchers and the introduction of a more reliable and accurate version of the SS-20 missile.
- Continued production of the Backfire bomber with a peak deployment of 200 aircraft in the late eighties.
- Introduction of a new peripheral-strike aircraft as both a bomber and a cruise missile carrier.
- Deployment of about 100 long-range sea-launched cruise missiles.

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### Economic Implications

The expenditure implications of the projected forces are much less dramatic when viewed in the context of total defense spending. We estimate that, regardless of the combination of projected forces the Soviets might procure, defense spending will continue to rise at an annual rate of about 4 percent. The most expensive force would cause defense expenditures to

spending continues to grow as past trends and present forecasts indicate—that is, at an annual rate of about 4 percent—the defense share of GNP will increase as

the economy slows. In 1985 it will be at least 15 percent, and by 1990 it could approach 20 percent.

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		25 <b>X</b> 1
Nevertheless, the potential resource commitments for various combinations of the projected strategic attack forces would have little overall impact on the economy. By the middle eighties, the defense share of Soviet GNP for the most expensive combination of forces would only be a few tenths of a percent higher than that for the least expensive combination. Such	small in relation to overall Soviet investment requirements and are highly specialized—not easily transferred to civilian uses. In addition, Soviet strategic attack forces use only between 8 and 10 percent of total military manpower, and any projected change would have little impact on the civilian labor force.	25X1
shifts in the share of GNP going to defense would have negligible impact on the overall growth of the Soviet economy. This is because the production resources that are consumed by strategic forces are	•	25 <b>X</b> 1

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A Ruble Cost Comparison of US and Soviet Defense Activities		25 <b>X</b> 1
Comparison of US and Soviet defense activities when both are measured in rubles shows that the Soviet total exceeded US outlays by 30 percent in 1979, whereas the difference is 50 percent when the measurement is made in dollar terms. Thus, whatever the currency used to measure defense activities, the Soviet resource commitment to defense is substantially larger than that of the United States.  The Index-Number Problem  Because dollars are the natural basis for discussion by US policymakers, CIA comparisons of the overall size	The direction of bias is associated with differences in relative resource costs. In producing any collection of goods and services, such as defense, a country tends to use more of resources that are relatively cheap and less of those that are relatively expensive. The choice will differ in another country with a different resource endowment. If the defense activities of a country with abundant supplies of cheap labor are priced in the currency of another country where labor is more scarce and expensive, that pricing will overstate the manpower resources devoted to the first country's defense establishment. If the defense activities of a	25X1
of the Soviet and US defense activities have traditionally been made in dollar terms. The Agency derives its estimates of the dollar costs of Soviet defense activities by applying US prices to detailed estimates of Soviet military activities. To state one country's activities in terms of another country's currency will exaggerate somewhat the size of the first country's effort. This phenomenon—called the "index-number problem"—has been the basis of some criticism of CIA attempts to compare Soviet and US defense costs.	country with relatively limited and expensive supplies of capital goods are priced in the currency of another country where capital is relatively abundant and less expensive, the pricing will understate the hardware resources devoted to the first country's defense establishment. Leaders of the first country, with cheap labor and expensive capital, will naturally choose a mix of defense resources that emphasizes manpower, and the result of using the second country's currency in a comparison is to exaggerate the size of the first one's defense costs.	25X1 25X1
The index-number problem refers to the inevitable difficulty in comparing economic activity in any two countries. To make such a comparison, the activities must be measured in common terms—specifically, they must be stated in a single currency. Since either currency can legitimately be used, the comparison can be done in two ways—which lead to different results. The essence of the index-number problem is that no unique result is possible in such an economic comparison among countries	As a result of differences in resource endowments, dollar comparisons of US and Soviet defense activities tend to inflate the size of Soviet costs relative to those of the United States. Manpower is relatively expensive in the United States, and the relatively high dollar wages somewhat exaggerate the size of Soviet defense activities, which are more manpower-intensive than those of the United States. Of course, comparisons can also be made in ruble terms, using Soviet price and wage data to cost US defense activities. Such ruble comparisons inherently exagger-	25X1
The prospects for making meaningful economic comparisons are not quite as bleak as this might suggest, however. The direction of the index-number bias in	ate the level of US activities relative to the Soviet level—the reverse of the distortion that occurs in dollar comparisons.	25X1
any single comparison is easy to identify, and the two complementary comparisons provide a logical range within which a meaningful difference lies.	A country may be more spendthrift (pay less attention to relative resource costs) in defense than in other sectors	25X1 25X1

Neither way of comparing US and Soviet defense activities—dollar costs or ruble costs—can avoid distortions totally, but the picture they provide together gives a reliable indication of relative sizes of defense activities in the two countries. The true size of the Soviet resource commitment to defense relative to that of the United States is likely to be no less than the ratio shown by ruble cost comparisons and no larger than the ratio shown by dollar costs.

#### Analytical Approach

A ruble estimate of US defense activities measures what it would cost, in constant 1970 rubles, for the Soviets to produce and man a military force of the same size and with the same inventory as that of the United States and to operate that force as this country does. To maintain consistency with the dollar estimates, we have used the same definition of national security activities that we used in dollar estimates.

For practical reasons, in calculating the cost of US defense activities in rubles we did not use the direct costing methods we use in calculating Soviet activities in dollars.<sup>2</sup> Instead, we developed the substitute methodology described below.

Resource Categories. Ruble costs for US defense activities were calculated by major resource categories—research and development (R&D), procurement, construction, operation and maintenance (O&M), and personnel. Personnel costs were derived by a direct-costing methodology because Soviet pay and allowance data were available. The other four categories were derived by multiplying the US dollar resource accounts (called resource identification codes or RICs by the Department of Defense) by appropriate ruble-dollar ratios.

The Defense Department organizes US defense costs into more than 80 separate RICs. These RICs cover each kind of activity (for example, personnel, O&M, or procurement of tracked vehicles) and each service (including the guards, reserves, and defense agencies).

An "account" such as aircraft procurement for the Air Force can include a diverse group of weapons and weapon components—all types of aircraft, air-to-air missiles, and major spare parts.

Ratios. Ruble-dollar ratios (developed originally to convert Soviet defense activities from dollars to rubles in those cases where we were not able to derive ruble values directly) were used to convert US dollar outlays to rubles. The original ratios applied to specific Soviet product groups—aircraft, electronics, missiles—that did not necessarily correspond to the US resource "accounts." To solve this problem we constructed new composite ruble-dollar ratios. These are weighted averages of the basic product group ratios, the weights representing the share of total costs of each product group in the particular resource account.

*Procurement*. Procurement presented a special problem. There are some items in the US weapons inventory—the F-15, for example—that the Soviet defense industry could produce only at extremely high cost because the quality or technology of the system is beyond present Soviet capabilities. To bring the ruble price for these items up to an appropriate level, we either adopted the ruble-dollar ratio appropriate to a Soviet weapon system of a later generation (which is higher) or increased the basic product group ratio by 20 percent. (The 20-percent differential is derived from a study of merchant ships.3) This adjustment was applied to an entire procurement account if there was in that account at least one weapon system in which the United States has such an advantage. Thus, this increase in ruble price tended to overstate the costs to produce, man, and operate the US force in rubles.

Personnel. Ruble personnel costs were calculated by a direct cost methodology. We distributed US servicemen into the four active services and into 21 ranks

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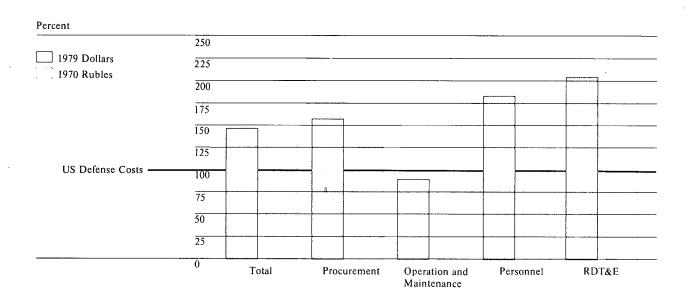
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<sup>&</sup>lt;sup>2</sup> For the dollar estimate, we ask appropriate US manufacturers what it would cost them to produce a given Soviet weapon. For the ruble estimate, the practical limitations are obvious: direct costing would require us, for example, to ask a <u>Soviet aircraft manufacturer the ruble cost of producing an F-15.</u>

<sup>&</sup>lt;sup>3</sup> A sample of US and Soviet merchant ships costed in both dollars and rubles found that the ruble-dollar ratio for US ships was approximately 20 percent higher than the ratio found for Soviet ships. The 20 percent is believed to reflect the more sophisticated technology embodied in US ships—which if produced under Soviet conditions would be relatively more expensive. The technology in merchant ships is fairly simple, however, and the 20-percent differential may be low when applied to advanced technologies.

#### Soviet Defense Costs as a Percent of US Defense Costs in 1979



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ranging from general to private. The manpower in each rank was multiplied by appropriate ruble rates of pay and ruble allowances for clothing, food, and medical care. Guards and reserves were turned into full-time equivalents based on the hours of paid drill and then multiplied by the average rates of pay for Soviet officers or enlisted men (we have no detailed rank structure for US reserve forces).

#### Ruble Cost Comparisons

Whether measured in dollars or in rubles, Soviet defense costs exceeded US spending by a considerable margin in the late 1970s (see graph). Total Soviet defense costs in rubles were 30 percent greater than those of the United States in 1979; measured in dollars they were 50 percent greater. That is, the Soviet "lead" in total defense costs measured in dollars is 1.15 times the lead measured in rubles. This spread between the ruble and the dollar comparisons for defense is much narrower than similar calculations for other sectors of the economies of the two countries.

For instance, in the case of production of consumer durables, the US advantage measured in rubles is almost twice the US advantage measured in dollars.<sup>5</sup>

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The spread between costs measured in rubles and dollars is narrower for defense than for consumer durables because of the relatively greater degree of similarity between the mix of defense outlays for the two countries. In particular, the two armed forces operate with similar equipment-manpower ratios. The USSR has much more manpower, but it also acquires much more equipment each year than the United States does. The basic similarity in structure of the two forces is dictated more by military considerations—they are preparing to confront each other—than by economic considerations. With such a basic similarity, relative defense costs measured in dollars will differ little from those measured in rubles.

other sectors of the economies of the two countries. 'Franklyn Holzman, International Security Review, Spring 1980, p. 89

<sup>4</sup> This 1.15 is derived by dividing 1.5 by 1.3.

The difference between the dollar and the ruble estimates was greatest for procurement—Soviet costs exceeded US costs by 60 percent in dollars and 25 percent in rubles. It was least for personnel—Soviet costs exceeded US costs by 85 percent, whether calculated in dollars or in rubles. The larger range in procurement reflects the USSR's relative disadvantage in producing the high-quality, technologically advanced US equipment. The lack of difference in personnel costs means that differences in the distribution of the ranks between the two forces are offset by differences in the relative rates of pay among the ranks. Soviet resource costs measured in either dollars or rubles exceed comparable US costs for every resource category except operations and maintenance. Here, the United States pulls ahead, reflecting the high cost of US petroleum, oil, and lubricants, the large US civilian payroll in defense, and high maintenance costs.

A Test of the Method

The assumptions made about the degree of the US lead in technology and quality were necessarily subjective. Therefore, a sensitivity test was made to analyze the effect of these assumptions on the total comparison. For this test the ruble-dollar ratios applied to the RDT&E accounts and selected procurement accounts were raised by another 25 percent. Even with this large change, the ruble cost of Soviet defense activities was still 15 percent above that of the United States in 1979.

Not all procurement accounts were affected, since in 1979 the United States had a clear quality and technology advantage for only certain weapon systems. In those accounts that were affected, however, the procedure required that the additional US advantage be applied to all systems in that account even though this country is not necessarily superior in all of them. For instance, the whole procurement account for Air Force aircraft was raised—not just the ruble costs of F-15s but also those of simpler aircraft such as F-5s, A-10s, and C-130s.

all procurement accounts were affected, since in 1979 the 1 States had a clear quality and technology advantage for ertain weapon systems. In those accounts that were affected,

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# Other Topics

Kirilenko has failed to appear at any leadership

his absence has appeared to weaken his political

vering.

functions since 1 March and, according to various

rumors, is ill. Whatever the reason for his inactivity,

position during a period of intense leadership maneu-

#### **Succession Maneuvering** in the Kremlin President Brezhnev, in the aftermath of senior party Without these decisive moves, Kirilenko's strength in secretary Mikhail Suslov's death, moved decisively to the party probably would have resulted in his becomsignal his preference in the succession sweepstakes for ing "second secretary." Given Brezhnev's failing his friend and protege, Politburo member Konstantin health—he reportedly suffered another setback after Chernenko. Some behind-the-scenes opposition to his trip to Tashkent in March—the poor performance Brezhnev's actions has developed, but this sniping of the Soviet economy, and the mixed results of his poses little threat to his position. The attacks, howevpolicy abroad, he probably felt such an accumulation er, indicate that succession maneuvering is likely to of power in Kirilenko's hands would be dangerous. intensify in coming months and increasingly preoccu-Pushing Chernenko into this position did not carry py the Soviet leaders. such a risk because Chernenko is Brezhnev's protege and lacks the power to act independently of the Soviet Following Suslov's death, Brezhnev moved quickly to leader. place Chernenko in Suslov's position as the party's unofficial second secretary. Brezhnev vaulted Cher-Rumors Versus Brezhnev's Power nenko over his chief succession rival, Andrey Kiri-Brezhnev's intrigues and his declining health have lenko, in the leadership protocol rankings and gave apparently inspired some opposition. An anticorruphim some of Suslov's duties. For example, he included tion campaign sponsored by Chernenko is being used Chernenko in the delegation that met with Polish by Chernenko's opponents to embarrass both him and officials and chose him to head the group attending Brezhnev. Rumors have been planted with Western the French Communist Party congress. correspondents linking Brezhnev's son and daughter to corruption scandals, and hints have surfaced that Brezhnev, moreover, assigned Chernenko some re-Brezhnev is at odds with some officials in the KGB sponsibility for personnel matters, heretofore one of over protecting his family. In addition, some articles Kirilenko's duties. The President also supported Cherthat have appeared in the Soviet press can be read as nenko's interpretation of ideological acceptability by thinly veiled attacks on Brezhnev. attending a play reportedly promoted by Chernenko and earlier opposed by Suslov. At the same time, This sniping is probably troublesome and embarrass-

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ing to Brezhnev, but it is not particularly threatening.

desperation of those like Kirilenko who oppose Brezh-

Such attacks, in fact, are risky and may reflect the

nev's recent moves.

Brezhnev has clearly demonstrated that he still controls events. He has strengthened Chernenko's position, attacked Kirilenko's, and made some key personnel changes. For example, he promoted a crony to the key post of first deputy chairman of the KGB, a move that belies the insinuation that he is having difficulty with that organization. He also removed the trade union chief, who may have been supported by Suslov and Kirilenko, and replaced him with an official indirectly criticized by Kirilenko earlier.

#### Infighting Will Intensify

Whether Brezhnev intended it or not, his recent actions have put the succession at the top of the leadership's agenda. The coming plenum of the Central Committee—probably to be held within the next several months—could produce significant personnel changes.

Chernenko, despite his recent success, does not have a lock on the succession. Having been a staff man for most of his career, he does not have the kind of executive experience that past party leaders have had. Although Chernenko will attempt to improve his position further, it is unlikely that Brezhnev will name him as heir apparent. Brezhnev may believe that Chernenko would protect his legacy, but he is well aware that conferring such power—even on a friend—could endanger his own position.

With Brezhnev gone, Chernenko's rivals, Kirilenko particularly, could probably defeat him unless he obtains additional help. Despite Kirilenko's current difficulties, he remains a formidable opponent. He has considerable experience as a party manager and in the past has acted for Brezhnev during his vacations and illnesses. As an original member of the group that replaced Khrushchev, he has had considerable opportunity to build a client network that would serve him well in a succession struggle. Even if he falters for political or health reasons, other more junior leaders such as Moscow party boss Viktor Grishin are likely to contest Chernenko's claim.

#### Outlook

While Brezhnev remains on the scene, this infighting is not likely to lead to significant policy changes. The debate over policy, nonetheless, will probably heat up, and some signs of dissension have already appeared. A change in investment strategy probably favored by Kirilenko was openly advocated in a recent *Pravda* article.

Those who oppose Brezhnev's political maneuvering may try to raise other issues in an attempt to put him on the defensive and complicate his political strategy. Brezhnev will work to keep policy on its current track, thereby avoiding the political risks that advocacy of major changes would entail.

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Soviet	Financing	of
Grain	<b>Purchases</b>	

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The USSR's cash payments problem is forcing Moscow to turn to costly short-term financing to pay for Western grain. The financial pinch, at least temporarily, is especially tight because of the slump in gold prices, the recent oil price erosion in Western Europe, and the continuing need to import grain at a record pace. Since last fall, the Soviets have raised more than \$1 billion in short-term credits to finance grain purchases. If, as seems likely, Moscow is able to line up credits for even one-half of the additional \$1.6 billion in grain we expect the USSR to purchase by the end of September, financial credits could approach \$2 billion. The annual cost of carrying this financing would add at least \$150 million to Moscow's debt service.

#### The USSR's Need for Grain

To help offset last year's harvest disaster, the Soviets have bought 43.9 million tons of the 45 million tons of grain we expect them to import before this June-July marketing year. Almost 29 million tons of grain were shipped by the end of February. Soviet trade officials have announced plans to accelerate the pace of deliveries this spring. Moscow is expected to buy an additional 11 million tons of grain during July-September (see table).

The USSR is benefiting from a buyer's market. A record world grain crop has forced wheat and corn prices in March to their lowest level in almost two years. With non-Soviet import demand weak, Moscow has considerable negotiating leverage with Northern Hemisphere exporters desperate to move existing surpluses before this year's summer crops are harvested. This leverage is somewhat offset, however, by the Soviet inability to pay cash and the tightness of the credit market. More recently, Moscow has had to contend with the possibility of grain supply disruptions that could result from the Falkland Islands dispute.

#### Financing Grain Imports

Unlike in the past, the Soviets have been forced to seek credit from the international banking community for part of their grain purchases, which may exceed \$6 billion in the current marketing year ending 30 June. Moreover, the Soviets are expected to purchase another 11 million tons—worth almost \$1.5 billion at current market prices—by the end of September.

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Three major sources of credit are open to Moscow:

• International grain trading companies have extremely deep pockets thanks to longstanding credit relations with major banks. By extending short-term credit to purchasers, using the firm's line of credit, the trader can profit from both the sale and the credit arrangement. The companies can also help arrange direct credit between bank and grain buyer.

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• Commercial banks independently will provide short-term, unsecured loans to grain-buying countries that are deemed creditworthy. Interest on loans is pegged to the US prime rate and the London Interbank Offered Rate (LIBOR) on most US-financed grain. Both prime and LIBOR rates have exceeded 15 percent for most of the past year.

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• Government financial assistance is available from some exporters to promote grain sales. Support can take a variety of forms, from providing direct credit to guaranteeing private loans. Canada and Australia both have offered credit facilities similar to the US Commodity Credit Corporation. In countries that have some nationalized banks (France, for example), the distinction between government and private commercial banking is obscure.

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#### Activity to Date

Grain purchased on credit to date represents more than one-fifth of the \$6 billion in grain ordered from Western exporters since July. In the past, the USSR paid cash for virtually all grain purchases. About \$800 million of these credits have been used to pay for

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USSR: Grain Imports, July 1981-September 1982

Million Tons/Million US \$

Value <sup>a</sup>	Expected Purchases (July-June)		Actual Purchases and Commitments to Date (July-June)		Expected Purchases (July-September)	
	Volume	Value a	Volume	Value a	Volume	Value a
Total	45.0	6,145	43.9	5,995	11.0	1,480
United States	16.0	2,150	15.3	2,050	1.5	200
Argentina	12.5	1,675	12.5	1,675	5.5	740
Canada	8.5	1,150	8.5	1,150	2.2	295
Economic Community	3.0	500	3.0	500	0.5	70
Australia	2.6	350	2.6	350	1.3	175
Eastern Europe b	1.2	160	1.0	135		_
Other b	1.2	160	1.0	135	_	_

a Estimated.

US-origin grain.

Although the Soviets have approached a number of banks directly, most of the loans have been arranged through grain trading companies. US, West European,

have all participated in the financing. The loans negotiated in late 1981 were usually for 60 to 90 days. The Soviets are now beginning to request even longer terms. Recently they requested but were refused 360-day terms,

Within the past month, French bankers reportedly granted a 150-day, 15-percent commercial credit for the purchase of nearly \$75 million worth of US corn, and a \$25 million Soviet purchase of US wheat was financed with credits from Italian banks. In the main,

these and other credits carry commercial terms of 15 to 18 percent—the going market rate—for 150 to 180 days.

The Soviets have in a few instances attempted to barter Soviet exports for grain. Late last year several international grain companies were asked to take Soviet potash and urea in partial payment for grain purchases. Although most of the companies turned down this offer, the USSR did arrange a barter deal with Thailand—500,000 tons of fertilizer for 100,000 tons of Thai corn. Because barter deals are so hard to put together, they are likely to continue to account for only an insignificant share of Soviet grain imports.

#### Immediate Financing Needs

The USSR will probably order an additional 11 million tons by the end of September—virtually all from the United States, Canada, and Argentina. Because of its acute hard currency shortage, the USSR is likely to continue to rely heavily on short-term Western bank credits to finance its grain bill over the next few months.

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b The Soviets do not pay hard currency for all of these purchases.

US grain traders have been told by Soviet officials
that all new grain contracts must include one-year
terms. Moscow's ability to obtain credits for US grain
will depend on whether the trading companies can
raise the required funds. The 2.2 million tons of US
grain we expect the Soviets to buy for delivery by 30
September would require additional financing of
about \$300 million. At the same time, US banks,
after initial willingness to make short-term loans for
grain, have become increasingly reluctant to lend
directly to the Soviets. One major US bank's policy is
to be receptive only to grain companies that have
traditionally been customers. The current financial
crises in several East European countries have
prompted bankers to limit their exposure in the
USSR. Bankers may also be responding to US policy
and public sentiment, which they interpret as discour-
aging trade with the Soviets.
aging trade with the Soviets.
Most of the non-US grain that the USSR is expected
to purchase by 1 October will come from Argentina

Most of the non-US grain that the USSR is expected to purchase by 1 October will come from Argentina. In late March, Soviet officials began negotiations with the Argentine Central Bank for a \$300 million credit with 150-to-240-day terms for the purchase of 3 million tons of grain. Although the Argentines have indicated they are willing to assist the Soviets in obtaining this loan on commercial terms, Buenos Aires is not likely to be able to advance the credits that the USSR wants. Moscow will probably have to rely mainly on commercial credits to finance purchases of Argentine grain. The Soviets reportedly are themselves arranging financing for the purchase of another 1.5 million tons of Argentine grain with West European bankers.

Other additional purchases are likely to be made from Canada, the European Community, and Australia. Canada and Australia both have official credit facilities similar to the US Commodity Credit Corporation.

the French Government has indicated that it would view favorably a request for government-guaranteed credits for future sales of French grain.

#### Outlook

The financial picture is not likely to change quickly. Oil and gold prices are likely to remain at their present low level for some time, keeping the pressure on Moscow's hard currency position. Grain imports are likely to remain at high levels through most of 1982 and into 1983. Even with a good harvest this year, Moscow will need to rebuild stocks depleted by three consecutive poor harvests. Falling grain prices will only slightly ease the strain grain purchases have put on Moscow's hard currency reserves.

Given its present financial position the USSR will probably continue to rely on short-term credits to finance most of its grain purchases over the next few months, possibly adding another \$1 billion in grain credits by the end of September. As interest rates and credit availability are expected to ease only gradually at best, the costs of such financing will remain high. Moreover, with previously arranged short-term credits maturing, Moscow will have the added pressure of paying off these loans in late summer.

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# **Briefs**

Weak Western Demand for Soviet Oil	The slackening of West European demand for Soviet oil has reduced the USSR's hard currency earnings and will substantially damage Moscow's hard currency position if it continues much longer. In March  Lisbon had decided not to renew an agreement signed	25X 25X
	last year to purchase oil from the USSR on a contract basis because of the high prices asked. Moreover, the Soviets reportedly had to concede price reductions in return for a firm commitment to maintain the	25X 25 25X
	the Soviets would accept almost any requested terms in order to maintain their volume of sales.	25X 25X
	Since the first of the year, Moscow reportedly has agreed to price reductions matching the decline of \$5 to 6 per barrel in spot market prices. If prices continue at the current level throughout this year, Soviet oil earnings will be reduced by about \$2 billion. Hard currency losses will, of course, be greater if the volume of Soviet oil exports also falls. The weak demand for oil—the USSR's major export—comes in the wake of three successive harvest shortfalls leading to large outlays of hard currency for grain, meat, and other agricultural imports.	25X
	2	25 <b>X</b> 1
Contention Over Investment Allocations	In a major article in <i>Pravda</i> recently, A. G. Aganbegyan, a prominent Soviet economist and director of the Siberian department of the Academy of Sciences, urged investment increases beyond those now planned for the machinery and equipment sector. More and better machinery, he contended, is crucial to achieving increased productivity, on which growth in national income depends. Publication of Aganbegyan's views in <i>Pravda</i> suggests that debate over how best to allocate investment may be continuing. Aganbegyan did not argue for an overall increase in the current five-year investment plan. Rather, he advocated postponing short-term gains to achieve a higher rate of return in the longer run by shifting investment into expanding capacity for new machinery and away from such areas as chemicals, metallurgy, timber, coal, and land reclamation. These and other sectors would ultimately benefit from improved machinery	25>
	Aganbegyan's argument is not without merit. For example, the quality and productivity of Soviet machinery are low, primarily because the machine tool park is technologically outdated. Low retirement rates have given rise to an increasing share of machine tools with rising maintenance costs and declining productivity. As a substitute for retirement, service lives are prolonged unduly by large annual increases in capital repair.	25X
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Grain Cr	op
for 1981	

Economic lecturers in Murmansk and Leningrad have indicated for the first time that the USSR's grain crop for 1981 may have fallen below 160 million tons. Two lecturers put the crop at 158 million tons, and another said it was between 150 and 165 million tons. "Znaniye" lecturers were among the first spokesmen to provide accurate figures for the disastrous grain harvests in 1975 and 1979. An official of an economic institute in Moscow repeated the figure of 158 million tons during a conversation with a US Embassy official on 29 March.

A crop of 158 million tons would be over 60 million tons short of the quantity required to permit small increases in the output of livestock products in 1982. The gap can be only partly filled by imports. The USSR probably will import about 45 million tons during the year ending 30 June; it has already bought 43.9 million tons for delivery by that date. As livestock feed supplies dwindle, the output of livestock products will continue to decline. Meat output for the first three months of 1982 was below 1981's depressed level, although a larger-than-usual number of hogs were slaughtered. Cattle slaughter weights in March were the lowest on record and milk output per cow was down 4 percent. Unless weather conditions—warmth and drying—allow early pasture use, farm managers may be forced to resort to herd reductions. This would temporarily increase meat supplies but would make it more difficult to meet longer term meat production goals as herds are rebuilt.

## Debate Over Economic Reform (U)

Debate over economic reform in the USSR appears to be gaining momentum. A spate of articles has recently appeared in the open press, for instance, praising the virtues of the Hungarian "model" and advocating the introduction of similar reforms into the Soviet economy:

- The March issue of the prestigious journal *Voprosy Ekonomiki* carried an article praising the decentralization of Hungarian agriculture, its flexibility and reliance on price incentives, and the encouragement and support given to private plots.
- A recent issue of *Pravda* effusively lauded the innovativeness of Hungarian banking and monetary policies.
- One of the most glowing tributes to Hungarian economic successes appeared in a March *Literaturnaya Gazeta* article discussing the Hungarian retail trade apparatus. Competition, decentralization, and flexibility in pricing were cited as the reasons for the Hungarian "economy of plenty."

Three consecutive years of poor economic growth, the political maneuvering for the succession currently under way, and recent events in Poland have all converged to make the climate for discussion of reform in the USSR more propitious than at any time since Brezhnev's accession to power in 1964. Thus far, however, this kind of discussion has not been reflected in pronouncements by upper party echelons. Opposition to reform by party hardliners concerned about the political implications of decentralization and with protecting their own self-interests remains strong.

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Soviets Disclaim Intent To Deploy Nuclear Weapons in Cuba	Since the speech in which Brezhnev said the USSR would put the United States "in an analogous position" if intermediate-range missiles are deployed in Europe, Soviet officials have denied that they mean to use Cuba for this purpose. Five days after the speech, the head of the USSR's Institute of the USA and Canada told a British interviewer that there was no basis for Western speculation that the Soviets intended to violate the Kennedy-Khrushchev understanding on Cuba. On 27 March, a senior Soviet general said in a Moscow television interview that the USSR could retaliate against the INF deployments without bringing "other territories" into play. Subsequently, a leading Soviet foreign policy specialist told the US Embassy that the general's statement was authoritative.	25X1 25X1
	By raising the specter of a new Cuban missile crisis, Moscow may have hoped that many in the West would come to view the planned deployment of US missiles in Europe to be as destabilizing as Khrushchev's gamble of 20 years ago. The Soviets probably saw, however, that the threat distracted attention from their moratorium offer and was counterproductive in terms of winning over public opinion. Soviet spokesmen, nonetheless, continue to speak in broader terms of the USSR's right and intention to retaliate if the United States proceeds with its missile deployment	
	plans.	25 <b>X</b> 1
New Tanks in the GSFG	The Soviets appear to be in the early stages of replacing the T-62 medium tanks in the two southernmost armies of the Group of Soviet Forces, Germany (GSFG) with the more modern and combat effective T-64. Tank units of these two armies have been armed with T-62s since the mid-1960s. The changeover probably will not be complete until 1987 if it proceeds at the rate at which T-64s have entered	25 <b>X</b> 1
	the other three armies in the GSFG.	25X1
	The T-64s probably are being introduced to counter the powerful Leopard II and M-1 Abrams tanks that are entering NATO forces opposite these two southern armies. These T-64s may be an improved version that is known to have been entering at least one of the other three armies in the GSFG since last July.	25X1
Progress on	The large military transport being developed by the Antonov Design Bureau in	25X1
New Large Military Transport	Kiev could be ready for flight-testing late this year.	25X1
· ·	the prototype is now in final assembly and could make its first test flight within seven to 10 months. A fuselage test fixture used to test the AN-22 (currently the Soviets' largest operational transport) is	25X1 25X1
	being enlarged, and the runway at the flight test airfield used by the Antonov Design Bureau is being strengthened.	25X1
	According to emigres, the program to build this transport was begun in 1973. The mockup of the aircraft reportedly resembled the C-5A, on which the design bureau had assembled extensive data. The program was apparently delayed about two	
	years in the mid-1970s, probably because of problems in engine development.	25X1
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Crime	Fighting	g in
Georgi	an SSR	

Top party officials in Soviet Georgia have intensified the pressure on lower level administrators to combat rising crime (much of which is associated with black marketing) and widespread corruption in the republic. Anticrime commissions have been established with republic ministries and party organizations, and the second party secretary is to report on the status of their work on a weekly basis. The organizational changes appear to be related to the ongoing nationwide anticorruption campaign and could be implemented in the other Soviet republics.

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In discussing the commissions, Georgian party chief E. A. Shevardnadze implied that the prevention of criminal activity is tied to the improvement of people's living standards—a rare open acknowledgment of such a connection. Georgia has long been known for its black marketing, in part because purchasing power is much greater than the regime's ability to deliver goods and services.

## Viewpoint

The views expressed in the following article are the author's and do not necessarily represent a consensus of CIA analysts.

The Many Burdens of Defense in the Soviet Union

Rubles, dollars, Computers, collars,

Engineers, chemists, Male or femist,

Capital and labor For plough or saber,

Opportunity cost,
Steel capacity lost;

We'd choose a measure if we knew how! Burden, burden, who's got the burden now?

Those who have followed the writings and estimates on Soviet military expenditures over the years are aware of considerable difference of opinion as to how much of a burden on the Soviet economy military programs are and as to the correct way to measure the burden. Ways of measuring burden have, indeed, proliferated in recent years. To illustrate this point, consider the following statements, all of which have been used to express the burden of defense on the Soviet economy:

- Defense expenditures are about 12 to 14 percent of GNP, when both are measured in ruble prices.
- Defense expenditures are about 11 percent of GNP when measured in dollar prices.
- 'Gross National Product.

• The ruble cost of defense in the USSR understates the burden on the economy because defense programs use especially high quality, scarce resources which are badly needed by the economy. 25X1

- Military R&D is about three-fourths of total R&D.
- Military procurement of machinery and equipment is about one-third of all final uses of machinery and equipment.

In the United States no one is particularly reluctant to use dollar cost as the measure of the burden of defense.2 The objection to the use of ruble cost in the case of the USSR stems in part from a widespread and well-founded suspicion of the usefulness or significance of prices in the Soviet economy. One can conclude from the haphazard incidence of shortages of industrial as well as consumer goods in the USSR that the prices do not represent relative priorities either of consumers or of planners. The artificiality of Soviet prices is, however, only a symptom of a much more fundamental disability of that bureaucratized system. The Soviet productive system is in a state of gross and pervasive "disequilibrium," in the sense of the word as defined in conventional equilibrium theory of economics. This paper attempts to explain how this theory applies to the USSR, and why, as a consequence, the ruble measure of Soviet defense has a very uncertain meaning.

<sup>&</sup>lt;sup>2</sup> Whenever I speak of cost as a measure of burden, I mean defense cost relative to some other aggregate such as GNP, for example, the dollar value of defense as a percent of GNP in dollars or the ruble value of defense as a percent of GNP in rubles.

It is to be hoped that this discussion does not strike a blow for ignorance. Nevertheless, it is a plea for recognition that we are in the presence of uncertainty. The problem is a briar patch of complexity. If the reader finishes this paper with the feeling that he understands the problem clearly, he is ahead of the author. The following simplified and condensed outline of the argument may help the reader to muddle through.

- The proper measure of the burden of defense is its
   opportunity cost, that is, the value of alternative
   goods and services done without in order to acquire
   defense.
- In a perfectly competitive market economy in "equilibrium," the *opportunity cost* of defense is the same as its *resource cost* or cost of production, that is, the sum of costs of all inputs used to produce the defense goods and services.
- The bureaucratic nature of the Soviet system, the physical allocation of resources by bureaus instead of market allocation, keeps the economy in chronic "disequilibrium."
- In an economy in a state of chronic "disequilibrium," opportunity cost has several different values, depending on which alternative goods are valued, and it is quite uncertain which of the many opportunity costs, if any, is measured by resource cost.
- Our ruble estimate of defense expenditures in the USSR is, more or less, a resource cost estimate and is a very uncertain measure of burden.
- Any other measure, such as the dollar cost of Soviet defense, is an even worse measure of burden.
- Effective transfer of research and development investment resources out of defense would require some drastic administrative reform.
- The impact of a change in defense in the USSR, like the burden of defense as a whole, should be considered to be multivalued. The value of a shift to investment, as measured by the effect on growth, may be much less than for a shift to consumption, or at least some kinds of consumption.

#### The Burden of Defense in Equilibrium

The burden of defense or any other portion of final demand in a market economy is, according to conventional economic theory, measured by the market value of the goods and services purchased (as a share of GNP), provided we assume the economy is in equilibrium. Equilibrium is defined precisely in general equilibrium theory. It states that a dollar's worth of defense (or any end use) forgone would release resources that could be transferred to produce a dollar's worth of any other good or service. The necessary condition for this is that the value of the product of any resource at the margin is the same in all possible industries. Thus, if a given kind of labor is used in both the blue jeans industry and the integrated circuit industry, the value of the product of one man-month of that labor will be the same in each industry.3 These statements are the basis for the definition of opportunity cost. The opportunity cost of one good is the value of other goods forgone. Hence the burden of defense is its opportunity cost—not its cost of production but the value of the other goods that could have been produced alternatively. In equilibrium, these two, the cost of production and the value of goods that could have been produced, are the same.

The key aspect of equilibrium is that opportunity cost, or value forgone, is single and unique; no matter what goods are thought to be given up, their exchange value is the same. A gun that costs \$10 would be produced by resources that could produce various other goods. Suppose those resources could have produced 11 pounds of butter, or four pipe wrenches. In equilibrium, 11 pounds of butter and four pipe wrenches would both have a market value of \$10. In the absence of equilibrium, opportunity cost (or burden) is ambiguous. The four wrenches might be worth \$8 and the 11 pounds of butter \$6, or \$12. In that case there are two possible measures of opportunity cost, or as many measures as there are possible alternative goods.

Perfect equilibrium in a market economy requires perfect competition! This happy condition does not exist in practice—certainly not in the United States.

<sup>&</sup>lt;sup>3</sup> The product of labor referred to here is its net product (or marginal product), product net of the costs of capital, materials, and other resources used in production.

However, the usefulness of the concept, in spite of the stringency of the assumption, can be clarified by some examples. In the United States, engineers must be hired in the market, and Revlon Corporation can, by paying a similar price, acquire just as good a chemist as Dow Chemical Corporation. Or a small computer service can hire just as good a programer as IBM uses on its fattest defense project. Auto producers can buy stainless or high-strength steel alloys at no price premium and as easily as military aircraft producers. Finally, government businesses and individuals pay the same prices for the same products by and large (allowing for such things as volume discounts). On the other hand, equilibrium is far from universal. Uranium is preemptively controlled by the government. Excise taxes, price supports, tariffs, and monopolies exert their influence. Nevertheless, in the United States, as in most market economies, there are strong private incentives for moving resources in the direction of equilibrium. The characteristic of equilibrium or a reasonable approach to it which is crucial both for the health of an economy and for measuring values in it is that resources can and do, given some time, transfer at small cost from one use to almost any other. This does not necessarily occur by direct transfer but by multiple, successive, and indirect shifts.4

#### The Burden in Disequilibrium

In an economy in disequilibrium the opportunity cost of a program may have many possible values or it may not even be measurable. For example, consider one part of the US economy, which is surely not in equilibrium—social services for the poor. Would \$5 billion taken from defense expenditures produce the same value of production in health services via some national health insurance, or would a large part of the

The easiest way of transferring resources to new or different uses is by preferential direction of new investment and new workers to the new uses, combined with depreciation and attrition of resources in the old uses. Most transfers of resources probably take place at this evolutionary rate. Frequently, however, changes in demand require a much more rapid and radical change. Then existing resources as well as new resources must be redirected. It should be noted that most physical assets cannot be easily moved to different locations. Transfer in that case means using the assets to produce a different product. The argument of this section and the succeeding one implies that for any degree or rate of reallocation of resources, including even full mobilization for war, the response of a market economy is likely to be more efficient than that of a centrally directed socialist economy.

funds be dissipated in higher incomes for doctors, hospitals, and associated enterprises? Or would \$5 billion transferred into an antipoverty program produce an equivalent value of output? In the latter case, there is no known way of measuring output.

The Soviet economy is in a state of pervasive disequilibrium. Resources in some activities are used very much more efficiently than in others. A few conspicuous examples are: the wide disparity in efficiency (output per worker) between agriculture and manufacturing; the great disparity in profits (negative and positive) between firms; the widespread production of tools and spare parts by enterprises for their own use at high cost compared to the cost of producing them in specialized tool and spare part enterprises; the surplus of some consumer goods coincidental with the chronic shortages of many other kinds; the enormous resources tied up in unfinished construction and uninstalled equipment. Not by the greatest reach of abstraction can one assume that resources are used in all industries at about the same level of productivity.

In the centrally planned and administered economy of the USSR, resources do not transfer easily from lowvalue uses to high-value uses. They do not transfer at all except by official plan or bureaucratic needs. Even under officially planned fiat, the shift of resources from their accustomed uses to new cnes is often painful. Witness Khrushchev's difficulty in accelerating the chemical industry at the expense of steel. When anyone below the top political leader seeks to change things, the results are likely to be nil. Gosplan and various ministers have been inveighing for decades against low product quality, excessive construction time, and inefficient small-scale production of spare parts and castings, and in favor of specialization of production and the introduction of new and improved designs. Yet none of these deficiencies has been noticeably remedied.

The burden of defense or its major parts varies according to what use one assumes the resources might otherwise be put. When in 1955 Khrushchev reduced the number of personnel in the armed forces and sent their equivalent to the Virgin Lands, he

achieved a gain in output very much larger than the reduction in defense cost. That opportunity was, however, unique. Other allocations of the resources released would have come out differing from the Virgin Lands result and differing from each other.

Any economy is in disequilibrium to one degree or another in the sense that transitional adjustments are always in progress and new developments are continually initiating additional adjustments. So long as resources can move in response to economic demands, the assumption of equilibrium can be usefully made. In such cases, monetary values are a reasonable measure of opportunity cost. But the Soviet economy does not respond like a market economy and ruble costs are an uncertain measure of the burden of defense.

I shall argue that the Soviet economic system should be analyzed like an administrative bureaucracy. In such a system the value of an alternative use of resources depends on what that use is, and furthermore, on what resources are to be transferred. A single ruble total for defense cannot convey these multiple values. However, none of the alternative measures are better, and indeed, are perhaps worse.

#### Alternative Measures of Burden

Let us consider first the significance of the dollar value of Soviet defense as a share of GNP, measured in dollars. If rubles are not to be trusted, then dollar valuation has an *a priori* attractiveness. The estimated dollar cost of Soviet defense programs serves the legitimate function of facilitating a comparison of the aggregative size of Soviet and US expenditures or components thereof. It does not, however, reflect the resource cost, much less the opportunity cost within the USSR.

The difficulty with applying US prices to the USSR is illustrated by the case of military personnel costs, including subsistence and quarters, and other outlays. In this case, the ruble cost is reasonably well known or easily estimated. That is not to say that the Soviet armed forces necessarily pay full resource cost on everything they purchase, but these full costs (for example, of food and uniforms) can be approximately estimated. The pay and subsistence of Soviet enlisted

men are very much lower than those of American enlisted men. While not conceding that the pay and subsistence of military manpower reflect their opportunity cost within the USSR, one can conclude that there is no justification for using the very high US pay and subsistence rates as a measure of the burden on the Soviet economy.

The rationale for using dollar prices applies, if at all, to the valuation of Soviet military equipment. The CIA has explained that the low ruble price of military equipment relative to its dollar price is mainly a reflection of the high cost of food and textiles in the USSR rather than of the efficiency of the Soviet arms industries. However, the feeling persists that the burden on the Soviet economy of producing such a substantial quantity of sophisticated equipment must be more than the estimated ruble costs imply. The dollar costs are surely not the right measure, but the Agency has implicitly concurred in the criticism of ruble prices by advancing a hypothesis about scarce, high-quality resources. Thus, we have said that the military establishment preempts especially highquality resources, both men and materials, which are badly needed for the modernization of Soviet industry, and that on this account the ruble costs of defense understate its effect on the rest of the economy. The discussion which follows suggests that this hypothesis may be misleading and should be reexamined in the light of the opportunity costs of these scarce resources.

In the first instance the high-quality-resource hypothesis implies that our estimates of cost per unit of weapons including research and development costs are too low. That may be true, but even if full resource costs were correctly estimated, there still might be a kind of understatement which would be significant. If the resources are badly needed in the civilian economy, then their productivity in civilian uses would be higher than resource cost. In this sense, the opportunity cost would be greater than the estimated ruble cost. If the Soviet economy is in disequilibrium, as argued above, this might be true. However, is it true in fact? For this question, the nature of the disequilibrium is crucial.

It is plausible to suggest that the rapid expansion of expenditures on advanced weapons in the early 1960s disrupted civilian programs of investment and research and development, and that it created shortages and bottlenecks of specialized types of materials and equipment. This argument is at least consistent with the very abrupt reduction in the rate of economic growth after 1960. But has this remained the case in recent years? Given time, specific bottlenecks can be broken simply by an adjustment of allocations within the overall civilian/military division of funds. But the continuing decline of the output-capital ratio and of the rate of growth of factor productivity despite rising civilian research and development, and strenuous administrative efforts to stimulate new technology, argues that the economic problems are probably chronic and more deepseated than the bottleneck hypothesis comprehends.

The problems of transferring resources from military to civilian uses, from investment to research and development, from any of those to consumption or vice versa are institutional in nature. The disequilibrium in the USSR is institutional rather than allocational. By this I mean that significant improvements in the Soviet economy cannot be achieved simply by reallocating funds, or even by changing physical plans and allocations. The existing state of affairs is entrenched in a bureaucratic administrative structure whose rigidities are an imposing barrier to change. The widespread belief that the Soviet leadership can reallocate resources at will in large quantities in any desired direction is not borne out by experience. They can reallocate some resources in some directions. The New Lands campaign was an impressive movement of labor and agricultural equipment. However, Khrushchev's campaign to expand the chemical industry had faltering and mediocre results, and is still not swinging in spite of continued support by Brezhnev and Kosygin. Moving labor around is much easier in the USSR than redirecting the use of plant and equipment.

The relation of administrative arrangements to the burden of defense can perhaps be clarified by an extreme example from history.

#### The Burden of Defense in Sparta

Suppose we were to ask what was the burden of defense in ancient Sparta. The question could not be answered in economic terms. The Spartan society and government existed primarily for war. Whether peace or war prevailed at any given time, the Spartans were perpetually mobilized. Resources did not shift between defense uses and civilian uses. On the contrary, labor was permanently divided into two classes, the Spartans who devoted themselves to a military life, making war, or training for the next war, and the Helots who were forcibly assigned to the job of supporting the Spartans and making their weapons. The Helots could not fight very well and did not want to fight anyone, except perhaps the Spartans, which they did when they thought there was a chance to rebel. The Spartans could not farm or shoe horses and certainly wouldn't want to.

The case of Sparta points up two problems in extreme form. First, it would have been very difficult to discover what share defense absorbed of Sparta's GNP, because the resources for defense, either the Spartans' activities or that part of the Helots' work devoted to supporting them, were not, in general, purchased in the market, but were preempted by command. (Estimating Sparta's civilian GNP would, of course, be no trick for economic intelligence officers.) The second problem is that even if the cost of production of defense in Sparta were estimable, its opportunity cost was not. An alternative use of resources and an estimate of its value could be achieved only by a radical institutional overhaul of the Spartan state and body politic, and all its tradition and ideology.

#### The Redirection of Bureaus

The Soviet economic administration resembles the Spartan one in interesting ways. Large parts of the military production are separated from civilian production not only by opaque security curtains, but different organizational subordination, and by different sets of rules and *modus operandi*. Under what conditions and in what condition can resources shift

out of military work to civilian? Some can shift quite easily; noncommissioned soldiers can shift to civilian employment at no loss in ruble value produced. The aircraft industry can shift from military to civilian aircraft fairly efficiently as it did in 1956-58. The same is true for those parts of the civilian equipment industries that are producing land armaments or related equipment, so long as they shift to similar types of civilian equipment. The difficulties center in the advanced weapons systems, both R&D, production and deployment.

It is evident that the Soviet military establishment has achieved a much more impressive record in fostering the development of new products and bringing them into serial production than has civilian industry. At least three conditions seem to favor these military activities. First, the familiar and ubiquitous supply difficulties of Soviet industry succumb much more easily to the gentle coaxing of military priority and expediting. Second, Communist party interference is at a minimum in military work. Third, and most important, military R&D and production benefit from the close, interested, and demanding supervision of the consumers of the product. This effective communication of users with producers is missing at all stages of civilian production.

The degree of difficulty of transferring the highquality performance of the military productive organizations to civilian objectives is impossible to estimate. When the United States wished to launch itself into space, it set up an entirely new agency, gave it a goal, priority, slogans, and resources. Perhaps the relative failure of the Soviet space program may be in part due to the fact that it was left under the control of the armed forces for whom space was a secondary goal. Recent efforts of the Soviet Government to improve civilian R&D—issuing more and still more instructions as to managing, training, paying bonuses, contracting with consumers, and so forth—have not been and are not likely to be very useful. A major institutional overhaul as well as a reallocation of resources would be required. The mills of gods and bureaucracies grind exceedingly small, but only if the product stays the same. If you wish to change from grinding flour to grinding lenses, or vice versa, then you need to get a new bureau'.

#### The Burden of Defense in the USSR

The conclusion to be drawn from the arguments above is that the burden of defense, that is, the opportunity cost of the resources used in defense, depends on which alternative uses the resources would be transferred to and which resources are to be transferred. Even with accurate data no single measure will be accurate. However, the ruble measure, allowing for a generous margin of error, is less misleading than any other single measure. Thus, the share of defense in total R&D, the defense share of machinery production, or of electronics production, while interesting in themselves, do not justify conclusions about burden. Each would suggest a much heavier burden than the actual total cost of defense in rubles as a share of GNP. None of these specifics has any more implication for the burden of defense than the share of titanium used in defense. In each case, as with ruble costs, the question to be asked is whether the opportunity cost of the resources or the value of the marginal product in alternate uses is more, equal to, or less than their cost in military use.

Because of the institutional disequilibrium of the Soviet economy, multiple and quite different answers can be expected as the opportunity cost of different kinds of resources. In research and development there is reason to believe that civilian industries could not effectively use large amounts of these resources without a substantial and unspecifiable institutional reform. Resources that could be shifted to civilian investment probably could do so at no loss in ruble value of product. However, the utility of investment depends on its rate of return, that is, its effect on growth. An accumulation of evidence indicates that the return on investment in its present pattern and distribution has gotten very low. This means that, barring some drastic institutional reform, a large transfer of resources from defense to investment is likely to increase the rate of economic growth by a disproportionately small percent. In both cases the suggestion is that the opportunity cost is probably less than the resource cost of the military resources.

How this might work out for various different kinds of consumer goods, for agriculture, for housing, for consumer durables, would have to be examined case by case. One supposes that consumer durables (including automobiles) could be expanded fairly readily by resources now used in defense production, but that consumer services, highways, repair services, and agriculture might quickly run into diminishing returns.

An important application of these views, if they are correct, is to the analysis of the economic impact of a change in defense spending such as might result from an arms limitation agreement. The argument here is that there is no standard or routine calculation that will give a useful answer. Each proposed change in defense spending must be studied as a special unique case with due regard to plans of the leadership, the alternative economic opportunities, and the possibilities for organizational change which might be in the offing. And for each change several alternative impacts could be estimated.



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